

# Inside: A New Section on Office Automation

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CW Photo by B. Johnson

John DiMeo

## DPer Ministers To Two Flocks

By Bob Johnson

CW New York Bureau

NEWARK, N.J. — He preaches on Sunday and programs on Monday.

His name is John DiMeo. As a deacon in the Roman Catholic church, the motorcycle-riding programmer performs his ministerial duties at St. John's Church here, spending weekends with transients, alcoholics and the poor.

As a DP professional, he spends the rest of the week as the newly appointed director of the Bronx Community College's (BCC) computer center.

DiMeo likes to combine his concern for people with his knowledge of computers. Early in his career, for example, he managed to become the director of data management at the Mount Carmel Guild Church here, where he created and managed the medium-size hospital's data processing equipment. While there, he converted the shop from a manual to an automated system with on-line and batch processing.

DiMeo has always had a concern for people, but his knowledge of computers came the hard way.

DiMeo began his DP career almost 20 years ago as a computer school director and moved on to instructing programmer trainees at Systems

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## System/34, 38 Prices Cut As IBM Adds Mid-Range 38

By Tom Henkel

CW Staff

ATLANTA — In a move some analysts see as an effort to bolster sagging revenues, IBM's General Systems Division (GSD) last week announced a mid-range model of its System/38 processor and made significant price cuts to its entry-level System/38 and System/34 processors.

The newly introduced System/38 Model 4, which analysts say represents a logical expansion of the System/38 lineup, offers about 35% greater performance than the entry-level Model 3. Model 3 users can field-upgrade to the Model 4, and Model 4 users can field-upgrade to the top-of-the-line Model 5, each in about four hours, IBM said.

The Model 4 features a memory cycle time of 200 nsec, the same as the Model 5, and is available with a maximum main memory of 2M bytes, also the same as the Model 5. Both models support IBM 3370 disk drives.

In addition, the firm announced all System/38 models will now support 5224 and 5225 matrix printers.

A typical Model 4 with 1.5M bytes of memory, 635M bytes of disk storage, 15 workstations and a line printer costs \$202,100; the same configura-

tion leases for \$6,078/mo. Deliveries are scheduled to begin in August.

IBM reduced by 16% the purchase, lease and rental prices on the entry-level System/38 model 3. While the price cut makes the System/38 more attractive to entry-level users, industry observer Tom Crotty of the Gartner Group saw it as an admission by IBM that the Model 3 has proved less than adequate for some users.

Some users have complained IBM's

(Continued on Page 2)

## Univac Extends Front-End Line

By Brad Schultz

CW Staff

BLUE BELL, Pa. — Sperry Univac last week introduced its second communications processor designed for network applications under the vendor's Distributed Communications Architecture.

Called the Distributed Communication Processor/20 (DCP/20), this product runs under Sperry Univac's Telecon software and — like the DCP/40 unveiled two years ago — may front-end the vendor's 1100 and Series 90 mainframes. The DCP/20

(Continued on Page 8)

## B80 User Wins Half a Million From Burroughs

By Tom Henkel

CW Staff

MOBILE, Ala. — Burroughs Corp. has been found guilty in state circuit court here of misrepresenting the capabilities of its B80 system and was ordered to pay a dissatisfied user \$500,000 in damages.

Burroughs will appeal the verdict, a company spokesman said.

According to the suit, Burroughs promised in August 1979 to deliver to Hall Affiliates, Inc. and Hall International Traders Corp. a B80/40 processor that would interactively control inventory and accounting functions. The Hall firms, which deal in wholesale floral distribution, claimed the B80 did not support either application interactively.

Burroughs contended it never promised the system would run in-

(Continued on Page 7)

## Businesses Told To Get Graphic

By Bill Laberis

CW Staff

BALTIMORE — Manufacturers that do not have an interactive computer graphics design capability should think seriously about getting one, particularly those who deal in lucrative government contracts.

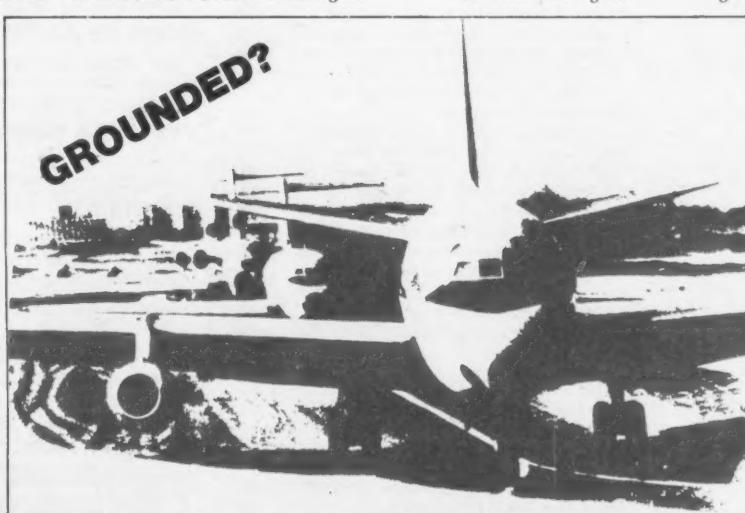
One good reason for doing

Coverage of the National Computer Graphics Association conference continues on Pages 10 through 13.

so is that a small but steadily growing segment of the large-scale customer community, like the government, is writing contracts imposing conditions that demand computer graphics.

"As the use of descriptive geometry systems increases, the transfer of wholly digital data between contractors and customers will become a broader requirement," said systems developer William L. Howard, who spoke at the National Computer Graphics Association's second annual conference and exposition

(Continued on Page 10)



At least 50% of the nation's scheduled commercial air flights could be left at the gate if air traffic controllers go on strike today — and chances looked good late last week that they would. Meanwhile, in Washington, a House subcommittee blasted Federal Aviation Administration efforts to upgrade air traffic control computers, and the new FAA chief claimed an interim system would be too expensive. Stories on Pages 4 and 5.

Wide World Photo

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# IBM Adds Software for System/34

ATLANTA — In addition to price cuts of up to \$6,000 on the System/34, IBM last week also announced additional software for that system — a group of licensed programs and three sets of application programs.

In a separate announcement, IBM reduced by 25% the license fee for users that centrally control the installation and support of some System/34 and System/38 programs. The fee reduction, which IBM called the Distributed Systems License Option, affects a total of 68 licensed programs and will be available Sept. 1.

The licensed programs, which handle various machine functions, include new versions of the System/34 system support and utilities programs, along with new versions of the Basic and RPG-II programming languages.

## Prices and Fees

One-time fees for the new licensed programs range from \$540 for RPG-II to \$1,800 for the system support programs. A typical software configuration including system support program, a utilities program and Basic carries a one-time total charge of \$3,240. System support programs, utilities programs and the RPG-II carry a one-time total charge of \$3,000.

The licensed programs, available June 26, can be used on any System/34 processor and will support a maximum of four display stations and four printers, IBM said. Other functions, including communications, Fortran and Cobol are not available with the new licensed programs, a spokesman noted.

The three sets of System/34 application programs announced by IBM handle order entry, billing, inventory control, accounts receivable, ac-

counts payable, sales analysis and general ledger. The programs cost between \$150/mo and \$450/mo for a

12-month pay period. Deliveries of the applications will start in July, IBM said.

# Mid-Range System/38 Out

(Continued from Page 1)

changes to the System/38 operating system and certain program products in 1979 were too much for the Model 3 to handle. Other users have charged that when IBM delayed deliveries of System/38, IBM salesmen recommended that Model 3 users upgrade to the larger Model 5.

IBM also made some drastic purchase price cuts last week on its System/34 line of processors. Processors with disk capacities of 8.6M- and 13.2M bytes were cut by \$5,000 and a 27.1M-byte system was cut \$6,000.

In addition, IBM announced new orders of those processors are available on a purchase-only basis.

## Why Price Cuts?

Gartner Group's Crotty theorized GSD is lagging behind in revenues and announced the purchase price cuts to boost the division's profits.

Analysts have been predicting GSD would announce an upper range System/34 processor sometime this year. Some, like the Gartner Group, think IBM will simply announce a larger System/34 processor, while others believe IBM will announce a new line of processors called the System/36. Analysts agree System/38 Model 4 is not a replacement for that processor.

Crotty pointed out that IBM traditionally stages a "fire sale" on processors that will be impacted by a new announcement. Based on that tradition, he said, IBM may announce by the end of the year a pro-

cessor slightly larger than the present top-of-the-line System/34.

Whether IBM announces a larger System/34 or a new line of processors depends on how well a reasonably new System/34 to System/38 conversion package works, Gerard Hallaren, an analyst for The Yankee Group, said. In the past, a conversion from System/34 to System/38 was not considered exceptionally easy. If the new package is a success, IBM will probably announce a larger System/34; if there are problems with the conversion software, IBM may be forced to revive the System/36 project, Hallaren forecast.

## No Direct Relationship

Crotty and Hallaren agreed the new System/38 processor and the price cuts on System/34 are not directly related. Both said a mid-range System/38 processor as well as a larger System/34 was expected, and a larger System/38 processor may be on the horizon as well.

The two industry observers also agreed that the System/34 family of processors is being phased out, but said the system will remain a competitive part of the GSD line-up for the near future.

Hallaren thinks IBM may phase out the System/34 and the less competitive System/32 in favor of larger models of the successful Series/1 minicomputer. However, Hallaren emphasized that is not a short-term possibility.

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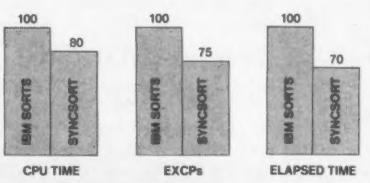
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## **Chart of the Month:**

### **Performance Comparisons**



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# Nationwide Walkout Today By Air Traffic Controllers?

By Marguerite Zientara

CW Staff

WASHINGTON, D.C. — The possibility of a nationwide air traffic controllers strike, scheduled to begin today, looked strong at Computerworld's press time last week.

The possible strike, which was expected to involve "a vast majority" of the nation's 15,000 unionized controllers, according to a Professional Air Traffic Controllers Organization (Patco) spokeswoman, resulted from fruitless negotiations between Patco and the Federal Aviation Administration (FAA). Negotiations ran from the controllers' contract expiration date of March 15 through April 28 and were only resumed last Monday.

While the reportedly troubled and antiquated computer-based air traffic control system was not a direct issue in the Patco/FAA negotiations, it is "part of the background" of the Patco/FAA relationship, the spokeswoman said. Controllers have long warned of the unreliability of the system and its potentially devastating impact on air passengers.

## Major Issues

The major contractual issues at stake were wages, hours, retirement benefits and work place conditions. A Patco "Press Hot Line" recording reported last Wednesday afternoon that informal talks at the Federal Mediation and Conciliation Service "officially broke down at 11:30 this morning," with no further talks "scheduled or contemplated."

On Thursday, U.S. Judge Thomas Platt in Brooklyn denied Patco's motion — filed 10 days ago — to vacate a 1970 injunction against the Air Transport Association of America, which represents the airlines. Because the injunction was not lifted, any job action by Patco would be illegal, since Patco members are U.S. civil servants. The FAA had filed a brief

in the case asking that the injunction not be lifted.

In spite of the adverse decision, Patco's spokeswoman insisted it would have "no effect" on the union's decision whether or not to strike today. Patco indicated it planned to file an "immediate appeal" to the Second Circuit Court of Appeals.

While the strike action, if taken, was expected to "severely" impact air transportation operations, according to an FAA spokesman, the agency's contingency plan "would keep the system going."

First priority would be given to "essential defense flights and medical flights," he explained.

## Airport Officials Not Amused

# Oakland Controller Files Fake Flight Plans

By Jeffry Beeler

CW West Coast Bureau

OAKLAND, Calif. — Officials at Oakland International Airport were less than amused recently when one of their air traffic controllers apparently pulled a prank by entering phony flight plans into the installation's air traffic control system.

Because they were discovered early, the controller's suspected actions only minimally disrupted operations in the airport's control tower and in no way jeopardized the safety of local air traffic, according to facilities chief Vince Mellone.

But if the alleged prank had been allowed to continue, the phony flight plans might eventually have accumulated to the point where they would have exceeded the air traffic control system's storage capacity. At that point, the system would have begun "dumping" some of its legitimate flight plans in an effort to make room for the incoming fakes.

Exactly why the accused controller,



He was there Friday, but will he be here today? Air traffic controllers threaten to strike today if contract negotiations with the Federal Aviation Administration were not resumed.

Wide World Photo

whose identity Mellone refuses to reveal, committed his alleged misdeed remains unclear. But airport authorities have opened an investigation in an attempt to find some answers.

The investigation, which seeks to decide whether the suspect acted maliciously or just mischievously, is expected to continue through mid-July. Until then, the controller has been relieved of all his job duties, although he remains on his employer's payroll.

## Suspect's Motive

The main purpose of the controller's bogus flight plan scheme was apparently to confuse and annoy one of his co-workers. Mellone voiced strong doubts that the suspect's motive in the case was sabotage, although he stopped short of entirely discounting that possibility.

"If we truly thought his intent was to sabotage the air traffic control system — and I'm convinced he had no such plan — you can bet we would

have fired him on the spot and turned him over to the Department of Justice," Mellone said.

Although the alleged abuse of the airport's air traffic control system took place in May, the incident stayed under wraps until it was reported recently in the Los Angeles Times, which put the total number of illicitly entered flight plans at less than 20.

The plans apparently consisted of a series of fake aircraft numbers, which the controller allegedly entered at his terminal keyboard. The numbers were soon displayed in a tabular list on a fellow air traffic controller's radar screen, where the flight plans were quickly found to be sham.

Phony plans can be readily identified because they lack corresponding "flight-progress reports," which are constantly being printed out for each genuine incoming and outgoing aircraft.

After the suspicious flight plans were proven to be false, they were rapidly traced to an on-duty air traffic controller, who was immediately removed from service and who now faces the prospect of "severe disciplinary action," Mellone said.

Fortunately for all the fliers in the area at the time, the controller's unauthorized keyboard entries were spotted and halted before the system had a chance to lose any of its existing data. "But we still don't know how far he would have gone if we had never caught him," Mellone said.

## Teletext Standard Now in Lap of FCC

WASHINGTON, D.C. — The battle for primacy in the U.S. videotex/teletext market moved to the Federal Communications Commission (FCC) early this month.

Telidon Videotex Systems, Inc., the U.S. marketing organization for Canada's Telidon technology, asked the commission to adopt a U.S. teletext standard based on variable rather than fixed coding.

Cefax, the British teletext system, employs fixed coding; Telidon, as well as Antiope — the French system — uses a variable format.



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# House Report Blasts Proposed ATC Upgrade

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The Federal Aviation Administration (FAA), threatened by an imminent walkout of air traffic controllers, last week received another dose of bad news: a House transportation subcommittee roundly denounced the agency's efforts to upgrade air traffic control (ATC) computers.

It is only by the grace of God, and no thanks to FAA safety procedures, that there recently have not been any fatal commercial airline collisions, Rep. John L. Burton (D-Calif.) said Tuesday.

Releasing a report that capped a year-long investigation of his Government Operations Subcommittee on Government Activities and Transportation, Burton said the aging air traffic control computers still threaten air safety despite several years of congressional pressure on the FAA to upgrade the systems and restructure its management practices.

Burton presented the report to the House Science and Technology subcommittee on aviation and transportation, which began three days of hearings on FAA plans to upgrade its equipment. The basic findings of the report included the following:

- "Computer outages pose a threat to safety, especially during peak traffic hours."
- "Because FAA's computer and facility performance reporting system and data are of dubious validity, it is impossible to reach conclusions on computer reliability."
- "FAA is not doing an effective job of alleviating problems caused by automated data processing equipment failures or planning for replacement of the equipment."

#### GAO Criticism

Further castigating the agency, Burton presented a June 2 General Accounting Office (GAO) report that said the FAA has "inadequately addressed" recommendations the Senate and House appropriations committees developed last fall for tackling some of the FAA problems.

Claiming frustration after dealing with what he considers an intransigent agency bureaucracy for the last five years, Burton said the FAA is not only the worst agency for DP planning, but has "absolutely no planning" for DP management and acquisition.

He laid much of the blame for the agency's problems squarely on the shoulders of Carter administration FAA head Langhorne Bond, whom Burton allegedly referred to recently as "the world's biggest jerk."

Burton's vigorous attack on previous FAA management drew sharp rebuttals from several members of the Science and Technology subcommittee. One member, Rep. Barry Goldwater Jr. (R-Calif.), noted the steadily improving aviation safety record and asked Burton if that record might not make his arguments against the agency unfounded.

However, Burton countered that Bond had nothing to do with the safety record. Pointing one finger to the sky, Burton said, "it's all due to God."

Echoing that view, the Burton sub-

committee report said, "The reduction of . . . aircraft mid-air collisions could just as easily mean we're overdue for a spate of them as it could

mean the . . . system is improving, especially in view of the dramatic increase in reported new mid-air incidents."

The report went on to particularly criticize the FAA computer outage reporting systems, saying they do  
(Continued on Page 6)

## New FAA Chief Rejects Interim System

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — J. Lynn Helms, new head of the Federal Aviation Administration (FAA), said last week his agency will not develop an interim air traffic control (ATC) system while planning its long-term upgrade, an upgrade not scheduled for completion before 1990.

Appearing before a House Science and Technology subcommittee on transportation and aviation last Tuesday, Helms said his review of the situation "has already con-

vinced me that development and implementation of interim solutions are not only expensive in terms of resources, but also detract substantially from our ability to develop real solutions which are necessary to meet our future needs."

Facing criticism that the present system will be overloaded and constitute a maintenance nightmare long before the future system can be implemented, Helms said an interim system would only complicate today's computer outage problems.

(Continued on Page 6)

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# DG Brings Out Its First Small Business System

**By Marcia Blumenthal**  
CW Staff

WESTBORO, Mass. — Making its long-awaited move into the small business systems market, Data General Corp. last week introduced its Enterprise 1000 system for businesses in the \$250,000 to \$15 million range.

The Enterprise offering marks the first time DG has introduced a system complete with application packages. Developed under the guidance of the "Big Eight" accounting firm Ernst & Whitney, a full range of accounting packages will be available. The first two, available in September, perform accounts receivable and order entry/inventory control functions. These packages are priced at \$1,000 each.

The hardware for the system is a 16-bit Micronova-based processor with 64K bytes of programmable dynamic random-access memory. It is a compact desktop computer featuring a video display terminal, keyboard and two 5 1/4 in. dual-density diskette storage units, each capable of storing 358,000 characters. The system also includes a high-speed bidirectional printer capable of 150 char./sec.

Essentially, the system is a repackaged Nova with integrated software. Some added hardware features that DG considers unique for a system of this size include placing on one printed circuit board what is normally put on four to seven boards in a cabinet and built-in diagnostics. Besides packaged software, the Enterprise also offers a developmental Business Basic programming capability for \$300 extra.

## First in Family

The Enterprise 1000 is the first in an anticipated family of small business systems. "When we finish the family, it will have the power of a small mini," Herb Richman, DG's executive vice-president, noted during an interview prior to the announcement.

Somewhat surprisingly, the Enterprise system does not feature word processing capability. However, it is highly likely DG will add that feature in the near future, implied Lawrence Seligman, vice-president and general manager of the Small Business Systems Division.

The system, including hardware

and operating system software, is priced at \$7,195. DG compared its small business entry to IBM's 5120 system.

Enterprise will be distributed through 130 retail outlets nationwide, with a total of 400 such retailers expected to be active within the next six months. The system will be available in September.

## Significant Opportunity

Although DG will market the Enterprise system only through retail outlets, it views the small business market as a very significant new business opportunity, Richman said.

"If you change the word minicomputer to microcomputer, it's 1969 all over again," Richman observed, adding that retailing should not be so surprising because the channels of distribution for computers have developed along with the cost curve for systems.

Richman had no specific projections for sales of Enterprise systems, but said that during fiscal 1982, commencing in September, the company would ship the units "in the thousands." DG expects to achieve normal profit margins for the product and is not necessarily looking at the Enterprise system as a way of attracting users to its mainline products, he added.

However, Richman noted that users entering the DG fold through the Enterprise system would be able in the future to convert to the firm's mainstream product line because the



Data General Corp. last week announced its Enterprise 1000 small business system complete with applications packages.

application software for Enterprise will eventually run under the Microprocessor Operating System, a subset of the firm's Advanced Operating System. But the conversion business is not DG's major reason for the introduction.

## Video Disk Training

Buyers of an Enterprise system will be trained to use the unit through a video disk training program. Training will be given at the retail outlet,

with DG providing retailers the video disk equipment on a leased basis. The company is also offering a special sales training program for dealers, he said.

Moreover, DG is offering a 90-day warranty on parts and service. Hardware maintenance will be available directly to users from DG at about \$72/mo. Software maintenance will be handled through dealers for whom DG has set up a toll-free hotline.

# House Report Blasts ATC Upgrade Efforts

(Continued from Page 5)

not give FAA management "a clear picture of what is happening in the field . . . because the basic orders and procedures from headquarters which govern reporting do not elicit or require the proper information."

The report said the FAA discourages accurate reporting of equipment problems and does not adequately categorize those problems that are reported.

As an example, the subcommittee said it found that one FAA facility in Puerto Rico was shown to be 96.8% reliable for the month of July in 1980. However, the committee said, the facility had been "completely de-

stroyed by a fire bomb" that same month. Because the bombing constituted one incident — albeit a permanent and total outage — according to agency reporting practices, the FAA conversion tables interpreted that one incident as giving the facility its high reliability rating.

The report expressed concern the FAA may be "lulled by unreliable outage statistics." The report also said the agency's efforts to manage its long-term acquisition of upgraded computer equipment is so drawn out as to assure the new computers will be obsolete when finally brought online.

The subcommittee study called for

strong centralized management over the planning and development of all computer-based information systems, including air traffic control data processing. The agency should also undertake a comprehensive long-term study of its equipment requirements, the report said.

The study called for a "single, verifiable failure [outage] reporting system for [FAA] air traffic control automated data processing" and suggested the GAO undertake an "investigation of the FAA's planning, management and acquisition of automated information systems for air traffic control and FAA management purposes."

# Helms KO's Interim System

(Continued from Page 5)

"Simply put," he said, "if we have difficulty in defining, operating, procuring and supporting two systems — the present and the finally configured long-range — it will be far too expensive and complex to attempt assimilation of a third system — an interim replacement."

Joined by FAA officials who described agency efforts to upgrade present systems management and develop the long-range computer replacement strategy, Helms said "our program schedule is ambitious and calls for development of a master plan covering system improvements by Oct. 1, 1981."

Helms added independent reviews are under way on a number of FAA systems and programs, including the

Discrete Address Beacon System, en route radar and national communications.

While not discussing specifics, he did say early indications are that the present IBM 9020 computer systems — 360 architecture machines that are the backbone of the air route traffic control system — will be replaced as part of the eventual system upgrade.

Additionally, Helms said, "I feel it is certainly desirable . . . to examine our alternatives and decide what the next generation air traffic control system should be." For example, he said, he would like to look more closely at the feasibility of satellite systems that could provide communications, surveillance and precision approach services to an ever-increasing number of aerospace users."

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## Burroughs Loses B80 Suit, Ordered to Pay \$500,000

(Continued from Page 1)

teractively. It countercharged that Hall Affiliates had expanded its operation after it ordered the B80/40 from Burroughs and said the user was too impatient with Burroughs.

Hall said Burroughs' brochures and a sales representative's verbal promises implied the B80/40 would support the accounting and inventory applications interactively. The user sued Burroughs on four counts: misrepresentation, breach of an oral contract, breach of an implied warranty and breach of contract. The company was found guilty by a jury of only the misrepresentation charge.

The Hall system was purchased in December 1977 and installed over the first three quarters of 1978. The system included a processor, console printer, two disk drives with 2.3M bytes of memory each, 64K bytes of main memory and a TD831 CRT terminal.

### Memory Increased

Burroughs later increased the main memory to 96K bytes, but Hall said the system still could not operate interactively. Burroughs disagreed, claiming the system was operating with the expanded memory, according to Hall attorney George Finkbohner, of Howell, Johnston, Langford, Finkbohner & Lawler.

Ken Coker, a consultant called to testify as an expert witness for the plaintiff, said it was technically possible to install the inventory and accounting packages on the B80/40, but there were problems in the system's master control program that caused excessive thrashing — the overhead involved with memory swapping in a virtual memory system.

Speaking of the original 64K-byte system, Coker said the user had to install a 150K-byte master control program (of which between 22K- and 36K bytes were constantly overlaid into the main memory), a Cobol interpreter, a network definition handler and the two applications, which Burroughs reportedly said average about 16K bytes each. Coker also testified that system generation required about 4K bytes of memory that could not be recaptured.

Hall told the court that Burroughs never sent a service executive to the

## Naruc Asks Review Of DTS Decision

WASHINGTON, D.C. — The National Association of Regulatory Utility Commissioners (Naruc) has asked the U.S. Court of Appeals here to review a Federal Communications Commission decision made last January allocating frequencies for wideband local distribution networks (Digital Termination Services) in major U.S. cities.

Naruc said it believes the commission has preempted jurisdiction over facilities that properly should be regulated by the states. Similar objections have been submitted to the commission [CW, June 1, 1980] and its January decision may be revised as a result.

site to analyze the problems with the system. In addition, the user said the only communication it had with Burroughs was through the sales representative.

On June 5, the jury acquitted Burroughs of the charges of breaching an oral contract, breaching an implied warranty and breaching the contract, but found the firm guilty of misrepresentation. The court ordered Burroughs to pay Hall \$95,000 in compensatory damages and \$405,000 in punitive damages.

The court dismissed Burroughs' countercharge that Hall changed its operation after the original contract was signed.

## New U.S. Attorney Asks Delay In IBM Post-Trial Proceedings

NEW YORK — U.S. Assistant Attorney General William F. Baxter last week asked that the start of post-trial proceedings in the IBM antitrust suit be delayed 60 days.

Baxter appeared in Federal District Court here to ask Judge David N. Edelstein for an extension from Oct. 1 to Dec. 1 in order to familiarize himself with the suit.

As part of his self-education program, Baxter asked the government's trial team to submit proposed findings of fact and rough drafts of the trial to him beginning in July. This tentative schedule would end in September when Baxter requested that IBM counsel

begin a series of conferences with him to discuss trial matters.

Thomas Barr, IBM's lead counsel, agreed to Baxter's plan.

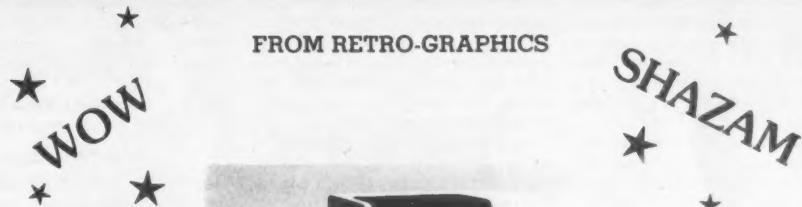
Asked about the government's stand on the divestiture of IBM, Baxter said there is a matter of cloning to be considered. "Cloning," Baxter said, would be the creation of pieces of IBM that looked like each other. A settlement could be reached if the parties agreed to total cloning.

Although the subject of divestiture is still a possibility as far as the government goes, Baxter said it is not too late for the government to drop the case.

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## Cites Insufficient Competition

# User Faults New Communications Act Rewrite

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — "Competition ought to benefit the user; a race to raise prices does not."

"If true competition existed today," said Robert Bennis, communications manager of Westinghouse Electric Corp., "private-line rates would not have jumped by 40% virtually overnight, imposing the largest rate increase in carrier history." MCI Communications Corp. announced a 5% increase immediately following that of AT&T, he added.

Bennis was the only spokesman for the telecommunications users among several witnesses who testified last week and the week before at a Senate Commerce Committee hearing. The subject was S. 898, the latest congressional attempt to rewrite the Communications Act of 1934.

Bennis' key point was that while S. 898 assumes that, beginning next year, there will be enough competition to support deregulation of key services, this is not the case.

He also criticized S. 898 for permitting AT&T to form "an unregulated subsidiary to compete with its own customers in unregulated services" — a possible reference to companies that plan to resell their existing private-network services to others as a way of coping with recent AT&T rate increases.

The chief accomplishment of the Senate hearing — at least by the end of the next-to-last session Wednesday, June 16 — was to win the Reagan administration's support for S. 898.

The committee's first attempt, about two weeks earlier, aborted, when the administration's spokesman, Secretary of Commerce Malcolm W. Baldridge, canceled his scheduled appearance at the last minute. The cancellation came after objections from Assistant Attorney General

William Baxter, whose office is prosecuting the government's antitrust suit against AT&T.

When he finally showed up, Baldridge was careful to say that the Administration supported "the thrust" of S. 898; at various other points in his prepared statement, he endorsed legislation "patterned after" the pending bill.

The secretary of commerce stressed he was speaking for the Justice Department as well as for the rest of the Cabinet departments, but when Sen. Howard Cannon (D-Nev.) asked if this meant the Justice Department is planning to end its antitrust suit against AT&T, Baldridge said he was "not prepared" to answer.

(S. 898 relies on formation of one or more separate subsidiaries to prevent unfair competition, while the Justice Department, in its suit, insists this goal can be achieved only if the phone company is forced to disown key parts of the Bell System.)

### Similarly Vague

Baldridge was similarly vague when Cannon asked how Congress could be sure the separate AT&T subsidiary specified in the bill would not receive preferential treatment — better quality circuits, for example — from Bell operating companies, enabling the subsidiary to gain an advantage over its competitors.

"Appropriate safeguards have to be set up in the bill," answered Baldridge, adding that "this is a highly technical matter." He suggested the committee seek a more specific answer from Bernard J. Wunder, the new head of the National Telecommunications and Information Administration (NTIA), which serves as the President's chief telecommunications adviser.

The Department of Defense (DOD) also supported the "general thrust" of S. 898, but — of possibly greater

significance — DOD did not insist that the Bell system must retain its present corporate structure to achieve this objective.

By comparison, when Secretary of Defense Casper Weinberger testified before the Senate Armed Services Committee last March, he said the nation's military security depended on the present integrated nationwide telephone network. He added that, as a result, the Justice Department lawyers who are prosecuting the antitrust suit against AT&T should drop their demand for divestiture.

Local-exchange access charges, electronic Yellow Pages and whether Congress should enact S. 898 while the antitrust suit is pending against AT&T were among the other key issues discussed at the hearing.

Access charges are important to private-network users because the pending bill would require them to pay for access. Private networks now interconnect with local exchanges free of charge.

William McGowan, chairman of MCI, complained that, under S. 898, the access charges will be set largely by the National Association of Regulatory Utility Commissioners (Naruc), which has a "demonstrated track record" of discriminating against interstate telecommunications users.

### Adds Surcharges

S. 898 also provides for surcharges, on top of the access fees, to keep the costs of local telephone service down. McGowan insisted that "AT&T's local rates have never been kept low by subsidization." Several other witnesses disagreed — notably Leroy Carlson, head of a company that provides telephone service in several very thinly populated rural areas of the U.S.

Because key members of the Senate Commerce Committee have a rural constituency, they may be especially impressed with Carlson's statement that up to 32% of the inhabited places in the areas served by his company's

affiliates have no telephones. Any reduction in the fees paid by long-distance users to support local-exchange operations could reduce this density significantly, he added.

Senate Commerce Committee Chairman Bob Packwood (R-Ore.), the chief sponsor of S. 898, spent some time trying to persuade AT&T Board Chairman Charles Brown to accept an amendment barring the phone company from providing any on-line information except for existing services and electronic Yellow Pages.

Brown finally agreed to the amendment, but quickly added that "I hope you will have no objection if I write you a six-page letter [of explanation] tomorrow."

### Bell Testimony

Griffin Bell, former-President Carter's attorney general, was much more definite about whether Congress should restructure the telecommunications industry while the Justice Department is dealing with many of the same issues in its antitrust suit.

"I was a federal judge for 15 years and can state with assurance... that questions of the magnitude posed by the AT&T litigation should be reviewed by Congress in a broad context. The legislative process is singularly appropriate for situations like this, which require a balancing of almost unlimited social, economic and policy concerns extending beyond the scope of the federal antitrust laws."

Bell thought it would be a good idea for the committee to invite experts in from the antitrust division and ask their advice in drafting the final version of S. 898. He also has "no problem" accepting the spin-off of Western Electric, he said, but sees "trouble" in replacing a divested Bell Laboratory (because of the high concentration of brainpower within Bell Labs at present). He added that he does not see how selling off AT&T's Long Lines Division would reduce the average customer's phone bill.

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## Univac Unveils Second Processor For Distributed Architecture Users

(Continued from Page 1)

costs less than half as much as the DCP/40, which can handle far more communications lines.

Able to support up to 45 lines and both asynchronous and synchronous transmissions as fast as 64K bit/sec, the DCP/20 can handle interactive, time-sharing and remote job entry applications simultaneously, a spokesman asserted.

The DCP/20 can run as a remote network processor and was said to improve network control and allow users to implement more different types of terminals. Other benefits include line cost savings and extended flexibility of network configuration, the spokesman added.

The 32-bit communications processor features 48 ports for full- and half-duplex serial or parallel line modules, and a storage capacity that

stretches from 256K bytes to 512K bytes in 128K-byte increments. All single-bit errors are corrected and all double-bit errors are detected, the spokesman maintained. Detected errors are automatically logged.

Basically, the DCP/20 consists of a processing unit with multiple microprocessors, local storage and communications line modules. The user can also add mass storage disk and tape subsystems, as well as host interface modules.

Supporting the Universal Data Link Control and character-oriented communications protocols, the DCP/20 features 32 general registers and a full word write cycle of 500 nsec.

The basic DCP/20 costs \$45,800. It can be leased for five years at \$960/mo, Sperry Univac noted. More information is available through P.O. Box 500, Blue Bell, Pa. 19424.

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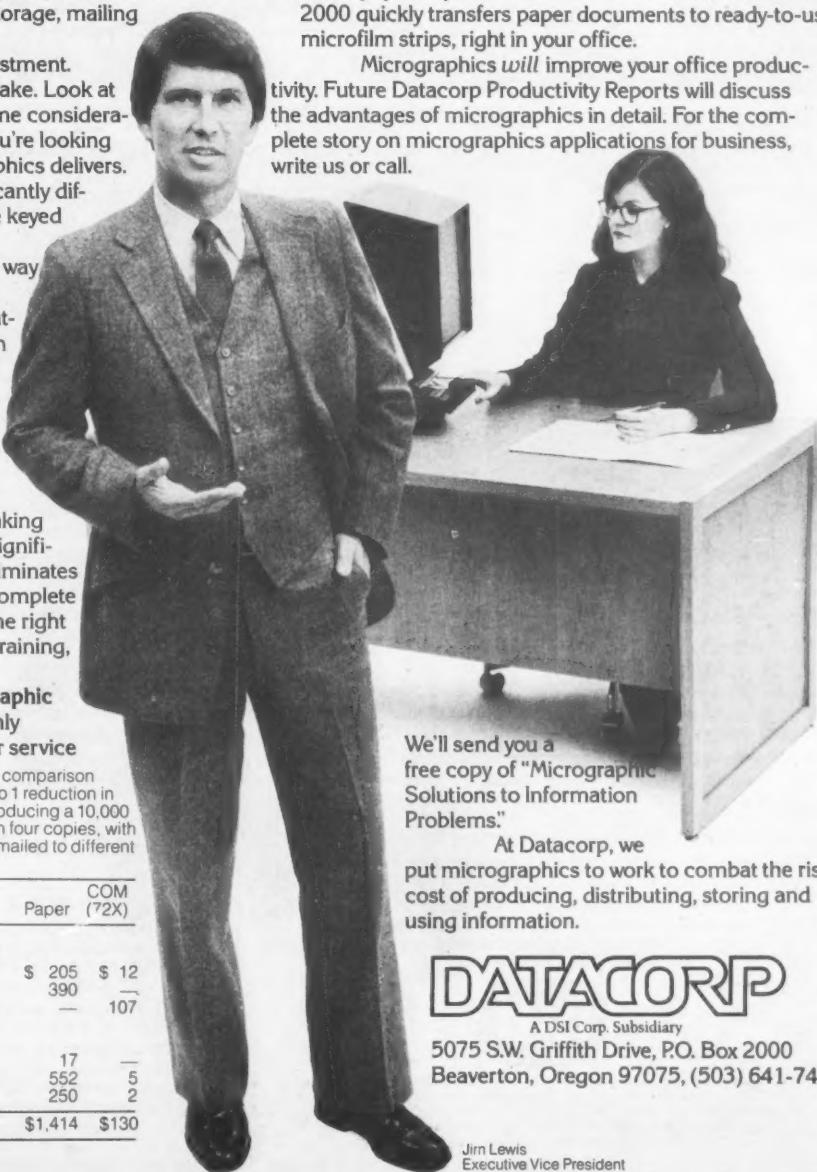
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Jim Lewis  
Executive Vice President

# Manufacturers Advised to Get Graphic(s)

(Continued from Page 1)  
 (NCGA '81) here last week.

Howard, president-elect of the NCGA, spent 18 years in the aerospace industry designing, developing and managing computer-aided design and computer-aided manufacturing (CAD/CAM) systems.

He termed himself an interactive computer graphics "believer," saying this technological capability broadens design avenues never before traveled with conventional, board-design methods.

But a big problem in making the move to CAD/CAM is that manufacturing and design companies are not guided by engineers and technicians, especially when a sizable capital expenditure is concerned, he said.

Somewhat computer graphics systems planners must make CAD/CAM believers out of the executives, controllers and "bean counters" who control corporate purse strings.

## Hard Sell

To justify expenditures to the financial powers-that-be, Howard, who has viewed systems development from both sides of the fence, suggested a corporate hard sell based on a detailed analysis of project benefits and costs.

The customer's CAD/CAM capability requirements, although difficult to prove without a contract proposal in hand, constitute the easiest sell, he said.

The U.S. Department of Defense, in

particular, with its projected \$200 billion-plus budget in 1982, is "looking much more closely at companies with CAD/CAM capabilities," he claimed.

## CW At NCGA

The next justification priority, that of using graphics as a means of capturing new business, cashes in on the "glamor" associated with CAD/CAM and computer graphics in general, Howard said.

However, this justification can also hinge upon improved quality of proposals, as well as upon improved quality of the products proposed, he added.

## Sexier Plan

Howard suggested further that a CAD/CAM feasibility plan will look even sexier if it is part of a long-range manufacturing plan, where the graphics system becomes a prerequisite to other systems and product development.

"If a major integrated system development plan is in place, the prerequisites can be mandatory," he said. "Look downstream at the end product you want and how interactive graphics is required for support. I know in aircraft design the complexity in the design process easily justifies computer graphics because it simplifies the complexity."

Press on with management, Howard urged. There is a nationwide dearth of designers and DP professionals with "critical skills." The name of the game with CAD/CAM is productivity; providing workers with the tools to "work smarter, not harder" will ease burdens of man-

BALTIMORE — The second annual National Computer Graphics Association (NCGA) conference held here last week drew 180 exhibitors, roughly four times as many as its only predecessor, organizers said.

Conference coordinators billed the exposition as a computer graphics educational vehicle for managers and systems planners.

Attendance at this year's conference topped the 7,700 mark, four times last year's attendance of 1,700 and more than double the NCGA's own preshow estimate of 3,500.

The NCGA said the figures are

testimony to the rapid growth in the popularity and interest in computer graphics, "a popularity that has succeeded even our own projections," according to a spokesman.

Based on a sampling of registrants, conference organizers found that more than 50% of the attendees were managers and executives "looking for a better way to do business."

Meanwhile, vendors at the show stressed the burgeoning growth of computer graphics, an area in which reported 1980 revenues of \$2 billion are expected to more than double by 1984.

## Meet Draws 180 Exhibitors

fies computer graphics because it simplifies the complexity."

Press on with management, Howard urged. There is a nationwide dearth of designers and DP professionals with "critical skills." The name of the game with CAD/CAM is productivity; providing workers with the tools to "work smarter, not harder" will ease burdens of man-

power demands while stemming employee turnover, he said.

Lastly, be prepared to demonstrate that CAD/CAM will ultimately improve overall product quality.

"Typically, this is a weak argument with management," he said. "If the company is already comfortable with its output quality the quality argument can be a lame one."

## The Preacher Is a DP Pro

(Continued from Page 1)

Development Corp. His educational background (he holds a B.S. degree in mechanical engineering, a master's in educational psychology and is working toward a Ph.D. in computer facilities management) spurred later moves to Hughes Aircraft and then to RCA Electronic Data Processing.

At RCA, DiMeo worked with the Spectra 70 computer and eventually worked his way up to a position at NBC News in New York, where he was a systems analyst for the network's election system from 1968 to 1972. At NBC, he implemented an inquiry/response system for vote collection and public opinion polling, as well as a large-scale real-time data collection system.

During his assignment at NBC, DiMeo's old home, RCA, converted from the Spectra 70 computer to IBM machines. When his expertise was no longer needed at NBC, DiMeo went back to RCA in search of a job — only to be shut out because he lacked IBM experience.

"I was always tempted to sue IBM for interrupting my career because of that," he said.

It was at that point that he joined Mount Carmel Guild Church hospital.

## Back to RCA

But DiMeo wanted a more stimulating DP environment than the hospital could offer. So he went back to RCA, this time to the company's Global Communications offices in New York as a telecommunications systems programmer. His duties included working on a message-switching system and providing the technical marketing support for subscriber message-switching systems sales.

His last assignment before joining

BCC was a three-year stint as an educational consultant at the New Jersey College of Medicine and Dentistry. There he installed an automated hospital management and library system and designed an applications library for a university educational network.

Appointed director of the BCC computer center on May 1, DiMeo says he receives, on the average, one call a week from recruiters because of his telecommunications experience. Big salaries are available, but his interest in people and his educational background steer him toward the management side of the computer industry.

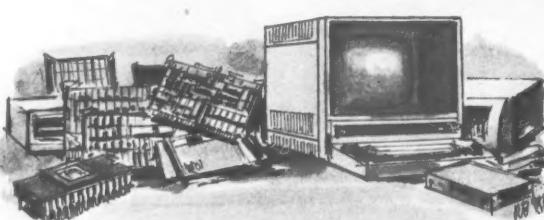
DiMeo feels he may reach his goal of becoming a good manager at BCC. He said that his deacon training experience is a big plus in an atmosphere like BCC's where it can be rough at times.

"There are some social problems that have to be faced at the college. Sometimes you have street urchins walking off the street into the data center," he said.

## People Problems

Twenty years in DP have taught DiMeo that most DP problems are people problems. Bad management and strict demands on programmers are examples. "Hardware today is marvelous. It's the people who cause the problems. Try to get a guy to come in and fix the air conditioning," he said.

DiMeo drew another analogy between his interests. "Faith is as solid as a rock, just like a computer. It's the people who mess things up," he said. As director of BCC's computer center, DiMeo is working with an IBM 4331 and a Digital Equipment Corp. PDP-11/34 and 1140. Presently, the 4331 is emulating 360/30 VM, DiMeo said, but he expects to be going to DOS/VSE. He also expects the DEC machines to migrate over to the 4331.



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*Assess Needs First, Orr Advises*

## Resist Graphics' Seductive Charm: Consultant

By Bill Laberis  
CW Staff

BALTIMORE — By its trendy and almost playful nature, computer graphics is a seductive technology whose charm can appear as a panacea for a host of management woes.

But all too often computer graphics system implementation is handled with utter and naive disregard for proper planning, and more than a third of the systems installed end up as "abysmal failures."

That is the graphics gospel according to Dr. Joel Orr, computer graphics consultant, who spoke before a crowd of more than 200 listeners at the National Computer Graphics Association second annual conference and exposition (NCGA '81) here last week.

While Orr's tutorial, "An Overview of Computer Graphics — What It's All About," was aimed at the novice or potential computer graphics user, he stressed that the overall success of the state-of-the-art technology depends on basic managerial common sense more than all else.

"The interactive graphics system is only a tool, it is not the end itself," he said. "It is a tool for the draftsman as well as for the engineer, the designer, the planner and the administrator."

### Right Cure, Wrong Disease

Orr warned users that, although computer graphics provides the cure, "your company may not have the right disease."

"Your problems may be management policy problems as much as anything else, so you've got to approach system development with planning, lots of planning," he said. "You're likely to find that old managerial habits die hard, and a detailed plan is likely to turn up many inefficiencies in the way things are done. To some, this can be quite threatening."

Orr recommended a multipoint plan called the "creeping commitment." Here, systems designers build upon a carefully architected implementation scheme intended to identify and isolate design pitfalls before any serious capital commitment is made.

The first step in the scheme is to sell the proposed computer graphics system internally, selling it in such a way that the concept is not couched in language unintelligible to the largely technically illiterate company executives.

"This means knowing what your business is doing, knowing who is drawing the pictures there and what

volume of manually generated graphics work is being produced, forgetting about what equipment is out there for the time being," Orr said.

"And I would suggest staying away from the vendors in the early going," he added. "The vendors offer a fine place to get information on the equipment available, but only you can know the specific and unique needs of your company."

This internal evaluation and preliminary "sell job" should be followed by a feasibility and applications study in which possible organizational changes that may result from systems implementation

are viewed.

The pivotal question in this step is whether the company can take prop-

"And if system implementation means that the 20 design engineers who spent 10% of their time actually doing conventional board design would be best replaced by three or four working on the graphics terminals full time, you must consider feedback from unions, if there are any," Orr cautioned.

A more detailed applications analysis should then follow, with two or possibly three applications selected and studied "painstakingly," Orr said.

Systems planners should include a representative from the users, a financial analyst and a DP profession-

(Continued on Page 12)

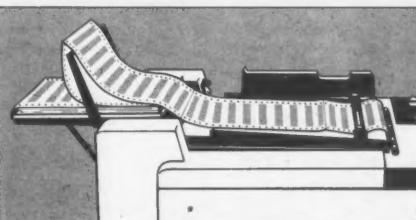
## CW At NCGA

er economic advantage of the technology, given the financial commitment required to get it.

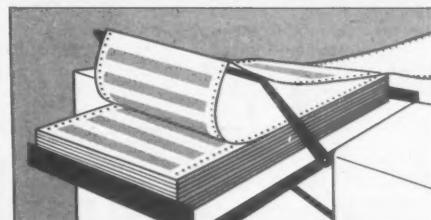
"That is, take a close financial look at the picture-producing aspects of your business and see just how much of your company's capital resources are committed to that area," he said.

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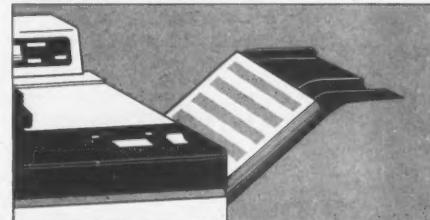
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# Venture Capitalists Like What They See In Potentially Rich Graphics Industry

By Bill Laberis  
CW Staff

BALTIMORE — Armed with more than \$3 billion in investment funds, venture capitalists scouring America for the right deal are taking a hard look at high-technology companies and at computer graphics in particular. They like what they see.

And as the investment community is continually looking for "significant waves of change," the rapidly mounting swells in the computer graphics area are luring large chunks of investment capital in search of a big kill.

"It's just a great time for computer graphics entrepreneurs to be raising money," said venture capitalist Howard E. Cox, speaking before vendors, users and other investors at the National Computer Graphics Association's second annual conference and exposition (NCGA '81) here last week.

"Venture capital is placing a very high priority on new investments in computer graphics," Howard continued. "With a good thing, it is quite easy now to raise a lot of money and give up very little ownership. We're that high on graphics."

Cox told the group his own company, Greylock Management Corp., of Boston, made 21 investments in 1979 and 1980. Nineteen of them were DP-oriented, and most have borne significant returns," he said.

The common theme in investment on the part of my company and others is the quality of the company

## CW At NCGA

we're looking at, and it doesn't matter if it's an established or new company," Cox said. "The market and growth potential of several high technology-related investments, as well as the people in charge [of the companies], have made them very attractive places to invest."

David Bellet, venture capitalist and former Citibank of New York employee, also told the group just what they had hoped to hear: that the market potential in computer graphics, coupled with whiz-bang technological changes that give newcomers the chance to "leap frog" earlier entrants, is making graphics investments increasingly more viable.

It is the smaller companies that tend to be at the fore of the rapid technological changes, and computer graphics is clearly not dominated by any one or small number of companies now, Bellet said.

Venture capitalists have also taken careful stock of America's evolution into an information- and service-based economy, noting that the typi-

cal worker in the information sector is grossly undercapitalized, he said.

According to his figures, there is about \$57,000 in capital equipment behind every American farm worker, and more than \$37,000 behind each industrial worker.

But each information and service professional is supported by less than \$3,000 in capital equipment, a figure that Bellet said underscores the imminent and continued sharp growth in the demand for data processing equipment.

He added this growth will be greatly augmented by falling hardware, memory and storage costs, which will make productivity investments in DP equipment more appealing, especially in view of escalating wage scales.

"Out of the office, there is a major revolution going on at the factory floors," he continued. "Instead of building costly new plants, managers are looking to maximize the productivity and work potential of existing work forces. Graphics and CAD/CAM are leading the way."

### Pro-Business Winds

Bellet added that changes in federal capital gains laws and distinctly more pro-business winds blowing from Washington have resulted in generally more investment funds becoming available to venture capitalists.

"We're also seeing more executives and technicians with 10 and 15 years' experience willing to chuck it all in and strike out on their own, and they're taking plenty of good ideas with them," Bellet said. "Of course they are looking for money, and in many cases, we're looking just as hard for them."

Bellet said the attention the investment community is paying to DP has resulted in a strong demand for investment specialists who are more intimate with the nuts and bolts of high-tech company operations than is a typical investment broker.

"I foresee an explosion in the demand for software packages in computer graphics, and venture capitalists are looking quite hard for good investments in this area, quite hard," he said. "I see 1983 as a big take-off point for computer graphics."

## Applicon Offers CAD/CAM For VAX Users

BALTIMORE — A computer-aided design and manufacturing (CAD/CAM) package for Digital Equipment Corp. VAX-11/750 and 11/780 users has been announced by Applicon, Inc. The package reportedly allows wire frame models to be transformed into color, three-dimensional solid models.

The Solids Modeling package, unveiled at the National Computer Graphics Association exposition here last week, is the first extension of the capabilities of a CAD/CAM system to include solids, the vendor claimed.

The package also allows solid models to be displayed on company systems as wire frame models to produce drawings and technical illustrations with hidden lines automatically removed, the company claimed.

The package features a sectioning ability that allows users to slice away or cross-section the model to reveal inner components or surfaces, with the sectioning being planar, stepped, rotated or partial, the company said.

With all necessary geometric and spatial design information contained in the model data base, mass properties such as area, weight, volume and moments of inertia are automatically calculated, the vendor said.

Output options include interfaces to the company's color plotting system, which creates full-color hard copy up to 22 in. by 34 in., the company said.

With deliveries scheduled to begin in December, Solids Modeling is priced at \$50,000 from Applicon, Inc., 32 Second Ave., Burlington, Mass. 01803.

## Graphics Held No Panacea

(Continued from Page 11)

al, Orr said. They must postulate exactly how these applications would be done using computer graphics vs. conventional design means, dealing at each step with managers and users who may oppose the system.

"One salient argument [for a computer graphics system] is that it will allow you more flexibility in hiring recent college grads because they're being trained now on the newest equipment and they're not likely to want to test their skills on a drafting board in the real world," he said.

After giving consideration to possible site specifications to accommodate the proposed system and providing for adequate training in the acquisition budget, the planners are ready to entertain the vendors, Orr said.

"Then you can listen and plan intelligently, but one more word of caution," he said. "Buy the software, don't try and build it, at least at first. It is a very difficult programming exercise, especially if you're not used to it."

## Corrections

The base price of Integrated Software Systems Corp.'s Disspla [CW, June 15] is \$24,500, not \$214,500.

In an article that detailed user ratings of CRT terminals and teleprinters [CW, June 1], charts from Data Decisions, Inc. misspelled the name of a vendor, Teleray, as "Telray."

According to Fujitsu America, Inc., the company was established in 1968, not 1971 ("TRW-Fujitsu Marks First Year With Show of Gear," CW, May 25). In addition, the M2312K and the M2351A disk drives were demonstrated at the National Computer Conference by Fujitsu, not the TRW-Fujitsu Co.

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# Pepsi Management Joins Graphics Generation

By Bill Laberis  
CW Staff

BALTIMORE — It used to take top financial executives at Pepsi-Cola Co. the better part of a week to review reports of the company's 32 divisions.

Poring over reams of statistics, hand-rendered graphs and sometimes flimsy charts, Pepsi's management would attempt to decipher marketing information to forecast trends and map strategies.

Now the paper chase around monthly review time has been pared to a comfortable one-day operation, thanks to the company's pervasive computer graphics system.

And executives now shuffle a fraction of the reports they used to. Instead, they study the neatly and accurately displayed lines, bars and circles colorfully drafted onto slides that, usually at a glance, prove again that one picture is worth a thousand words.

"Color graphics gave us the advantage of selective emphasis while greatly improving the productivity of our top executives," Susan W. Ulicny of Pepsi told about 150 listeners at the National Computer Graphics Association second annual conference and exposition (NCGA '81) here last week.

"The whole thing caught on so well and so quickly that it is a stated corporate objective to develop color graphics into a standard output medium throughout Pepsi," she said in the paper session on Business Graphics.

## Graphics Sponsor

According to Ulicny, one of the key factors in getting computer business graphics to Pepsi was the presence of a graphics sponsor "fairly high up in the company." The sponsor made an initial investment of about \$60,000 in graphics equipment, a viable proposition when the graphics idea was broached to financial management.

Once up and running and debugged, the graphics system stood on its own merits, quickly coming to the fore as a pivotal management decision-making tool while generally simplifying the financial decision making process, she said.

With its Xerox Corp. 6500 color graphics copier and Chromatics, Inc. color graphics terminal linked to an IBM 370 mainframe, Pepsi annually churns out more than 6,000 charts, including 4,500 linked to the data base and updated automatically, as well as some 2,500 color slides.

In addition, the company is planning some software enhancements to expand map-making capabilities to take advantage of the demographic information forthcoming from the 1980 federal census, Ulicny said.

Raymond Jacques of General Mills told of similar experiences in computer graphics at the giant food processor's corporate offices, although Jacques cautioned users to beware of software shortcomings.

He cautioned further about the costs of computer-generated charts and graphs, costs which many financial managers and other divisional users have a hard time justifying.

General Mills began using computer graphics on a time-sharing basis 10 years ago strictly for marketing

applications. Since then, applications have been extended to include report presentation, financial and management graphics and personnel and transportation tracking, Jacques said.

"Users who liked the graphics did so because they felt it was less expensive than other presentation methods and was generally more accurate than hand renderings," he said. "It also provides a remarkably fast turnaround, which means that graphs can be updated before a presentation with the absolutely latest information."

"But the big payoff is that business graphics really get the point across in very definite terms," Jacques added.

Using its Hewlett-Packard Co. 2648 graphics terminal, HP 7221 four-col-

or plotter and HP 3000 minicomputer, General Mills purchased the Zplot and Zchart graphics software packages from Nicolet Zeta Corp.

The company later added the Issco

"Plottit gives us flexibility to integrate data files into graphics capabilities, but it, too, has its pitfalls."

In general, graphics software "requires an expert to manipulate it," and producing a graph or chart is still labor intensive, Jacques said.

In addition, most graphics software is written by programmers who clearly do not have the artistic flair of a graphics artist, nor a sense of color and proportion, he added.

"We need more user-friendly software, as well as terminals with better resolution that can reduce production costs. But in conclusion, I have to say we are sold on computer graphics and feel as though we are in the midst of an output revolution with lots of good things yet to come."

## CW At NCGA

Co. Tell-a-Graf and Disspla packages before designing its own in-house creation, Plottit.

"Disspla is very flexible with a Fortran programmer and will make 35mm slides," Jacques said. "But it does not provide an easy way to integrate graphics into the data base."

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# AEA Working on Solution to DPer Shortage

By Robert Batt

CW West Coast Bureau

**SAN FRANCISCO** — More part-time university professors, part-time students and company-sponsored research projects are among the options under study by a group of industrialists trying to overcome critical computer manpower shortages.

The industrialists, working under the auspices of the American Electronics Association (AEA), are attempting to formulate a set of proposals designed to recruit more and better qualified computer scientists and engineers.

Through the formation of a Blue Ribbon Committee in Engineering Education [CW, May 25], the AEA is calling on its best brains to tackle a problem that has grown steadily worse over the last decade and threatens the U.S. technological lead.

Dr. William Perry, former defense undersecretary in the Carter administration, is chairman of the committee. Perry, now a partner with Hambrecht and Quist, the San Francisco investment bank, told *Computerworld* that the source of the problem is a lack of qualified teaching staff.

#### Professorial Shortage

"There is a severe shortage of educational facilities, in particular a shortage of computer science and engineering professors," Perry said.

"We will be considering ways of increasing their supply in the long and medium term and of working round that problem in the short term. For example, we are looking at the idea of industry supplying adjunct professors to the universities whereby they remain employed by their companies and teach on a part-time basis," he said.

Perry argued that because industry was causing the shortage of qualified teaching staff by snapping up the most promising graduates, it should also contribute to the solution.

Perry said the committee, which would present concrete proposals for implementation by AEA members in September, was also looking at ways in which companies could financially support university research in return for commercial feedback on any

new applications.

The committee, which is halfway through its deliberations, is currently looking at ways to initiate more joint projects between universities and industry involving a transfer of equipment and people, since, according to Perry, most of the state-of-the-art thinking is being carried out in companies.

Perry added: "In the longer term we have to get more students taking graduate courses. A distressingly high proportion of computer science students stop at the bachelor degree level with most of our best students then going straight into industry."

The solution is a cooperative program between companies and universities so that, for example, a stu-

dent could work half-time with the company and half-time on a degree."

If the plan were adopted, he said, it could change the role of teaching staff with computer science professors having one foot in the academic world and one foot in industry.

#### Grave Consequences

But Perry warned that failure to deal with the problem of manpower shortages would have grave consequences for the country with its technological advantage threatened both by Japan in the commercial field and by the USSR in the military arena.

Perry said the committee's job was to propose a course of action that would eventually increase the quantity of computer scientists and engi-

neers while maintaining high standards in education and training.

"Our task is to identify where the pressure points and bottlenecks are in the system and to propose actions that will remove them. This is not a committee that is going to file a report and then retire. We intend to put forward concrete proposals for industry to take and we have enough highly qualified people working with us to get support for a concerted effort," he added.

Perry said the committee would also make recommendations to government, particularly at the state level, regarding what it can do to expand the capabilities of educational institutions and help reduce the manpower shortage.

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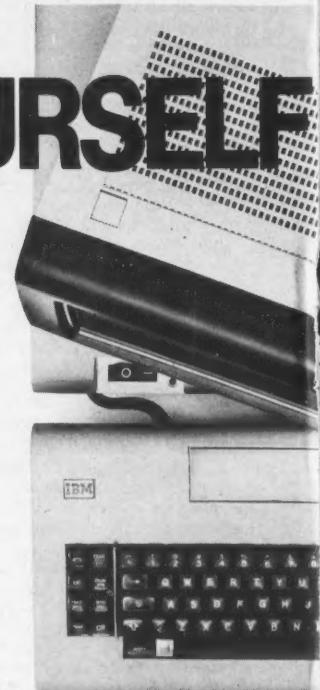
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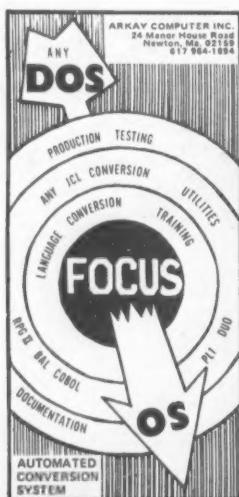
1,920 characters in 24 lines and you'll see they're as distinct in the corners as in the center of the screen.

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## Minimum of Training Needed

# Group Hoping to Place Retirees in High Tech

By Lois Paul

CW Staff

**FRAMINGHAM, Mass.** — They have 20 to 40 years' business experience, strong typing ability and a willingness to work part-time. They represent a potential pool of workers for the high-technology industries that has yet to be thoroughly explored. Who are they? Retired people.

Bay Path Senior Citizen Services, Inc. is looking into ways to interest the abundance of high-technology companies in its own backyard in hiring skilled, older workers who can be productive with a minimum of training.

The first step was a recent meeting of 34 statewide representatives of the Older Workers Employment Network co-hosted by Bay Path and Prime Computer, Inc. at Prime Park in Natick, Mass.

### People Meet Machines

The seminar was intended to acquaint people in the state who are handling reemployment of the elderly with the modern office equipment that workers will have to deal with.

Paul Connally, Prime's marketing education director, explained, "Senior people were raised on typewriters, and terminals are new to them.

This lack of knowledge can make them [terminals] seem kind of scary."

Connally described the meeting as "information gathering" only. "We were happy to host them. Bay Path does not expect us to train senior citizens. What comes out in the future is up to them."

"The best way to train older people in DP would be at the regional vocational-technical schools which have computers and computer courses available, rather than bringing people from across the state to somewhere like Prime for training," Connally said.

Samuel Davis, field manager for Bay Path, explained that its current

employment service places on the average of 22 unskilled or semi-skilled older people in jobs each month.

"Regarding our skilled workers, we are compiling a brochure of thumbnail sketch resumes. We will be circulating these among high-technology industries and companies which use this equipment," Davis said.

The companies can select people who seem to fit their programs and needs and request in-depth resumes and follow-up interviews, he explained.

### Established Skills

"We have people who are excellent typists, typing 60 to 80 words a minute. They have been typing all of their lives. They retired a number of years ago before computers became the advent," Davis said.

Other skilled workers in Bay Path's file are thoroughly familiar with inventory control, budgeting and other recordkeeping parts of a business or industry, he added.

"We have approached three high-tech firms. Digital Equipment Corp. was all excited about the idea, but didn't do anything about it as yet. Raytheon Data Systems Co. is very interested and wants to see the brochure with the thumbnail sketch resumes as soon as it is completed. Prime has been the forerunner with this," Davis said.

Davis noted that the older workers are contented with part-time work and less than full-time wages. He added that a program with two workers sharing the same job would be ideal for this group.

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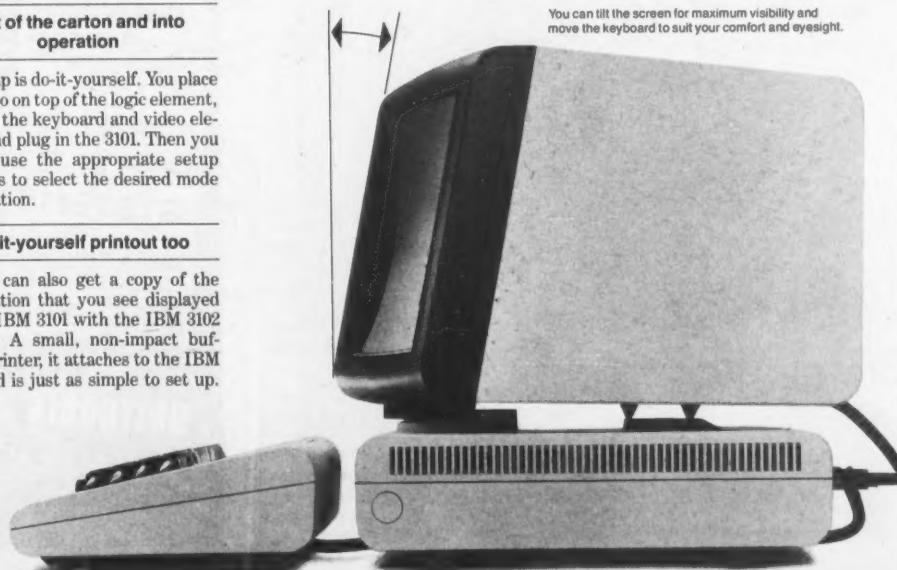
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# Unesco Rejects Role as Opponent of Data Flow

By Christopher Simpson

Special to CW

WASHINGTON, D.C. — A United Nations agency official has denied that his organization favors the restriction of international data flows.

Dragoljub Najman, assistant director of the United Nations Educational, Scientific and Cultural Organization (Unesco), stated in a recent interview with Computerworld that the controversial UN agency is "unilaterally" in favor of the "free flow of information" and the corporate leaders who have argued otherwise are "not well informed."

Unesco has been under considerable fire from the West recently for its advocacy of a New World Information Order.

"In the past, the main criticism [of the U.N.] in the press has been that the United Nations and its agencies were inefficient and ineffective," Najman asserted. "All of a sudden, we are now supposed to be able to stop the flow of information, to restrict the free flow of information. Usually well-informed persons seem to believe that there are bureaucrats sitting in Paris [at Unesco headquarters] who can turn on the flow of

information and turn it off. That is absolutely absurd."

The issue of international data flow, generally known as transborder data flow (TDF), is of particular concern to banks and other international companies that must move large amounts of data in order to coordinate their operations. Restrictions on or, as some fear, taxation of such flows could mean significant costs for such companies.

Najman claimed the increasingly sharp confrontation between multinational corporations and national governments over information policy can be eased.

"These two groups, who may argue over privacy and other concerns in one situation, may find they have much to agree on in another. We think that discussions can help with the process [of understanding]," he said.

Much depends on the economic situation in the coming years. A bleak international economic picture will tend to increase calls for protectionism in many fields, including data processing, he noted, comparing developing countries' calls for restrictions on TDF to U.S. demands for restriction of Japanese auto imports.

## MacBride Study

Najman also specifically dissociated Unesco from some of the conclusions of the recent MacBride Commission report on information policies.

That study, prepared for Unesco, favored "freedom of information" as a "basic human right," but criticized calls for a "free flow of information." The commission argued that the term "free flow of information" was generally used as code for the continuing Western domination of information processing and telecommunications. (A recent Organization for Economic Cooperation and Development study, for example, found that more than 80% of worldwide data transmissions flow to or from U.S.-based centers). MacBride will "have to speak for himself" on the wording of his report, Najman stated.

## CCIA Seeks Reversal Of FCC Decision

WASHINGTON, D.C. — The Computer and Communications Industry Association (CCIA) and three other opponents of the Federal Communications Commission's (FCC) Second Computer Inquiry Decision have submitted briefs to the U.S. Court of Appeals here asking for reversal of the decision.

The FCC has no authority to construe AT&T's 1956 Consent Decree and cannot decide to forbear from regulating common carriers, the brief contended. (These are the main underpinnings for the commission's determination that AT&T can offer "enhanced" services on a deregulated basis).

Furthermore, the "so-called separate subsidiary" mandated by the decision is not sufficiently separated from its parent, AT&T, and the commission violated both its own rules and the Administrative Procedure Act in considering objections, the petitioners said.

In contrast to Najman's approach, however, were recent reports that Unesco's director general, Amadou-Mahtar M'Bow, had directly linked regulation of transborder data flows to other New World Information Order issues at the recent international media conference at Talloires, France.

## Criticism at Talloires

M'Bow's comments came despite sharp criticism of Unesco at Talloires for allegedly attempting to restrict the "free flow of information" in the press and other media.

But such criticisms in the media reflect a "serious misconception" of Unesco's point of view on information policies, according to Herschelle Challenor, the organization's Washington, D.C., chief.

Challenor argued that the group has constantly favored unrestricted international information flow and has resisted attempts to declare information within national boundaries the exclusive property of individual states.

The very real imbalances in global data flows are not simply a Unesco or Third World concern, she said. Developed countries in Europe have often been in the forefront of efforts aimed at regulating data flow.

In related news, the Intergovernmental Bureau on Informatics (IBI) completed its working group meetings recently with a series of "unpolitical ... even flabby" resolutions, as one informed observer put it. The IBI, which is not part of Unesco, is an intergovernmental organization generally thought to be a key Third World voice on information policies.

This year's IBI resolutions, however, were for the most part limited to calls for studies of the impact of transborder data flows and for improved communications among scholars working in the field.

Simpson is a free-lance writer based in Washington, D.C.

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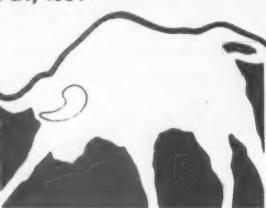
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## Stresses Software Planning

# Exec Says Programmer Productivity Just a Fad

By Jeffry Beeler

CW West Coast Bureau

**SAN FRANCISCO** — The computing field has become overly preoccupied with the programmer productivity "fad" and should be concentrating instead on improving the quality of its software planning and design, according to Smallframe Systems, Inc. President Peter Lamasney.

All the current fuss over programmer productivity is a "waste of time" and a symptom of the computing field's widespread failure to "adequately plan, manage and architect systems that include DP," the head of the on-line satellite systems vendor said.

"We don't need more programmer productivity," Lamasney told attendees of the recent Government Management Information Sciences conference. "We don't need more systems that fail, never get completed, require constant maintenance or don't operate as the users intended."

### Poor Planning

One of the reasons new systems are often so woefully defective is that they suffer from poor planning, design and management. So the key to improving the reliability of the computing field's services lies less in speeding the production of code than in increasing the effectiveness of its systems analysis.

"The real issue facing the computing field today is not the productivity of programming [by itself], but the productivity of DP" as a whole, Lamasney said during his recent talk.

Application developers will have to clarify the definition of their requirements and objectives and increase their software flexibility if they expect to avoid undue program maintenance, minimize system failures and provide services that truly meet their user's needs. In short, the speaker explained, they will have to master the knack of doing effective systems architecture.

### Development Important

Lamasney also urged application developers to sharpen their definition of system attributes and to decide beforehand what their prospective user services will do, how they will affect existing systems and what their overall impact will be when they finally go into operation.

By themselves, efforts to address the programmer productivity issue will do little to relieve systems' shortcomings or upgrade the general level of a computing department's user services. Such efforts will only

allow the computing field to "reinvent the wheel more rapidly," Lamasney explained.

Substantial increases in DP productivity will be forthcoming only after the industry has learned to overcome the problem of developing adequate systems architectures."

### Apparent Obsession

Much of today's apparent obsession with improved programmer productivity arises from widespread confusion about exactly where programming fits in the overall scheme of new-systems development.

Many people, especially programmers themselves, like to think of pro-

gramming as a "creative art form." In truth, Lamasney said, programming is a mechanical, monotonous, clerical job that consists of little more than translating a given systems design into machine-readable code.

The only portion of the systems development cycle that requires a high degree of creativity is the initial design phase, which ideally should be left to analysts rather than programmers. Thus, speaking of a "creative programmer" is a bit like speaking of a "creative plumber, which no one in the industry needs," Lamasney said.

Continuing in the same vein, the local company president likened applications development to the con-

struction business, with programming playing roughly the same role as carpentry and system design corresponding to architecture. Just as carpenters would never dream of trying to do an architect's job, so programmers have no business interfering in system design.

The implication of Lamasney's analogy is that the responsibility for ensuring a new application's user appropriateness and the soundness of its design falls to systems analysts rather than programmers. "No one blames the carpenter for building a bridge in the mountains when the original plans called for a dam in the valley," the company president said.

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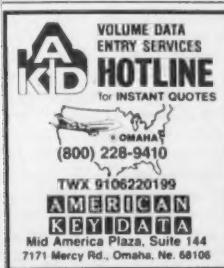
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## New Directions Needed

# DBMS Theory Seen Unappealing to End Users

By Jeffry Beeler

CW West Coast Bureau

**SAN FRANCISCO** — Data base management has remained such a highly theoretical, abstract specialty that it has reaped almost no practical dividends for nontechnical end users, according to Applied Data Research, Inc.'s marketing director Kenneth Parker.

The extremely complex theory underlying data base management systems (DBMS) holds very little appeal for most end users, who would prefer to know what the products do rather than how they work, Parker said at a recent Government Management Information Sciences conference.

In a discussion of "New Directions in Data Base Management Systems," Parker likened DBMS end users to automobile owners. Just as most drivers can operate a car without un-

derstanding the workings of an internal-combustion engine, so the vast majority of information-systems end users can take advantage of a DBMS without intellectually grasping its supporting theory, the marketing director explained.

Yet despite the end-user community's pragmatic turn of mind, the emphasis in the DBMS field is still mostly on theory.

Another major flaw with the commercial DBMS sector is that it has clung to a "single-application orientation rather than spanning multiple applications and the whole information resource," Parker said. "DBMS have been made into little more than a fancy access method even though they are much harder to use than most of those common methods."

In other DBMS-related comments, Parker described the concept of the "relational data base" as a "new reli-

gion" that, like so many other information systems buzzwords, lacks a precise, standard definition. References to relational models appear in 38 in-house vendor publications, each of which defines the phenomena somewhat differently, Parker said.

"When people use the term 'relational data base,' they're usually referring more to a concept than to any single implementation," he added.

### Key Feature

One of the key features that distinguishes the relational from other varieties of DBMS models is its use of the "flat files" concept, which means all data is expressed in terms of tables.

Another feature common to all relational models is their use of "normalization" to put data tables in their most stable form and to maximize their resistance to change. Normalization allows redundant data and variable-length records to be eliminated, Parker said.

All relational models also differentiate between physical and logical data, use high-level languages (higher than Cobol) and stress simplicity in user access to data, according to Parker.

Parker.

Despite the widespread lack of agreement about exactly what the relational concept means, Parker sees the model as "the only way to go" during the next 10 years. Relational DBMS are increasingly supplanting their structured counterparts, as evidenced by IBM's recently introduced System Query Language, which is expected eventually to result in some 10,000 licenses.

"We don't live in a structured world," Parker said. "So we've been forced to develop nonstructured techniques that basically give data to users and allow them to manipulate it as they see fit."

Looking to the future, Parker foresees the emergence of new, specialized types of terminals and expects the notion of "data view" to acquire increased importance during the next few years. Under the data view concept, every user would be provided with a list that specifies the types of corporate information files the individual is authorized to see.

The lists, which would be retrievable on demand, would give each user his own perspective, or view, of a company's overall data base, Parker said.

## Standards Seen Lacking For Program Development

By Jeffry Beeler

CW West Coast Bureau

**SAN FRANCISCO** — Programming should conform to the same standards that are routinely applied to every other important business function, but thus far the computing specialty has consistently failed to do so, according to IBM's data security manager, Bill Murray.

"Only in programming do we allow a product to be tested by the same person who built it," Murray said last week during the annual conference of the Government Management Information Sciences Association. In just about every other field of endeavor, product testing is done independently of product development.

"The way we should build programs is not substantially different from the way we already build 747s and CPUs," Murray said, and he called on computing personnel to develop new systems with the same "rigor" that has historically characterized the construction of passenger jetliners.

"In the long run, it's simply far cheaper to develop systems with so much rigor that there's a high probability that your programs won't contain any errors," Murray told his listeners. "Repairs, adjustments and recalls of finished products can prove very expensive indeed."

Unfortunately for most businesses, very few new systems are developed with the necessary degree of strictness. "Most programmers simply throw a few instructions together, exercise them and then add a few more instructions to make the first ones work," Murray said.

The IBM executive also criticized the computing field for purportedly failing adequately to monitor its programming changes. "I would venture to guess that 90% of all changes to programs are initiated by programmers and entered into their systems without explicit management approval," he said, and he urged information systems chiefs to tighten their existing controls.

Some information systems managers resist the idea of tightly controlling program changes for fear of stifling their programmers' creativity, but Murray dismisses such concerns as unfounded.

"The head of a computing operation has got about as much need for a creative programmer as a construction site manager does for a creative bricklayer or welder," he said.

In other comments, Murray attacked what he calls the "myth" that programmers write more efficient code in low-level languages than in high-level languages. He also advised information systems managers not to rely exclusively on low-level, nonprocedural languages in their application development efforts.

"Usually, the way we build new systems is to identify the most complex 10% of the job, pick the language that is most flexible for doing that task and then spread the language as best we can over the other 90% of the application," Murray said. "But that standard practice is 180 degrees off course. What we should be doing instead is to pick a language that's just barely flexible enough to cover the whole of an application and then use a low-level language only for the most difficult 10%."

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## To Boast High Data, Channel Rate

# Late '80s CPUs Predicted to Execute 30 Mips

By Jeffry Beeler

CW West Coast Bureau

**SAN FRANCISCO** — A typical large-scale uniprocessor of the late 1980s will execute up to 30 million instructions per second (Mips). It will also boast an aggregate data rate of 200M bytes per second and a channel rate of 20M bytes per second, according to an Amdahl Corp. strategic planning consultant.

This type of high-powered mainframe will clearly represent a tremendous advance over current CPU performance levels and will form the basic building block for the large-scale systems of the early 1990s, Robert O'Neill said last week at the an-

nual conference of the Government Management Information Sciences group.

O'Neill's predictions of an eventual 30-Mips processing capability applies, not just to his own company's future mainframes, but also to most competing processors, both inside and outside the IBM sphere, he said.

Much of the large expected increase in high-end mainframe performance will stem from dramatic improvements in both logic and main memory circuitry.

On the logic side, the dominant technology, at least for the short haul, will probably continue to be N-channel MOS circuitry, O'Neill pre-

dicted. By the late 1980s or early 1990s, a typical NMOS circuit will offer a switching speed of 500 psec, a signal delay of 1,600 psec, a cooling capacity of 16W per chip and a density of 20K- to 30K gates per chip.

Even higher performance will be available through the nearest NMOS competitor — emitter-coupled logic (ECL), which within the next 10 years will achieve 100-psec switching speeds and 400-psec signal delays. Between now and about 1990, ECL can also be expected to increase its per-chip density from 400 to 700 gates to 5K- to 10K gates and its cooling capacity from 3- to 4W to 16W, O'Neill said.

### Exotic Technology

Both ECL and NMOS of course, will eventually give way to even more exotic logic technologies like Josephson junctions, which promise switching speeds and signal delays as low as 20 psec and 100 psec, respectively. But do not expect Josephson junction logic chips, which cease operating at temperatures higher than about four degrees above absolute zero, to become commercially feasible until 1990 or even later, O'Neill warned.

At present, the main stumbling block with Josephson junction-based machines is that, if they ever break down, the necessary repair work would have to be delayed at least 24 hours to give the supercooled components a chance to warm up to room temperature.

Then, after all the servicing was

completed, the components would have to be re-cooled for another 24 hours before users could resume their normal processing operations. Thus, the minimum downtime for a malfunctioning Josephson junction CPU would be 48 hours — an intolerable interruption, O'Neill said.

Another technological advance that will likely enhance the performance of large-scale mainframes is improvements in MOS random-access memory (RAM) circuits. By the end of the decade, a typical main memory circuit will provide a 50- to 100 nsec access and will hold 256K bits, which will translate to 1M bit per chip.

But even with enormous improvements in access times, main memory chips will still run much slower than their logic chip contemporaries. By about 1990, the need to help close the speed gap will prompt the development of superfast ECL cache memories that will consist of 16K-bit RAM chips and operate with accesses as fast as 2- to 3 nsec, O'Neill predicted.

Other major developments that seem certain to affect the large-scale mainframe sector during the next 10 years will include:

- The decision to extend addressability from 24- to 31 bits — a move necessitated by limitations in IBM's existing 370 architecture, which will prove increasingly unable to accommodate future increases in processing power.
- The emergence of modular architectures that will allow different functions like I/O processing and arithmetic processing to be logically separated and performed in their own dedicated processors.
- The development of specialized operating systems to control those dedicated processors.
- Continued reliance on air as the primary CPU cooling medium.
- Increased use of fiber optics as an alternative to conventional electrical cabling.

## Calendar

**July 27-28, Boston — CAD/CAM: A Management Overview.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

**July 27-29, Denver — EDP Disaster Recovery: How to Develop, Test and Maintain a Plan.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

**July 27-31, Santa Cruz, Calif. — Computer System Performance Prediction for System Tuning and Configuration Planning.** Contact: Adele Wood, University of California Extension, Carriage House, Santa Cruz, Calif. 95064.

**July 27-31, New York — CICS/VS Command Language.** Contact: Boeing Computer Services Co., 22 Floor, 825 Third Ave., New York, N.Y. 10022.

**July 27-Aug. 14, Seattle — Cobol Workshop.** Contact: Boeing Computer Services Co., Box 24346, MS/9A-90, Seattle, Wash. 98124.

**July 29-31, London — International Microcomputer Exhibition.** Contact: TMAC, Suite 428, 680 Beach St., San Francisco, Calif. 94109.

**July 30-31, Denver — EDP Disaster Recovery: Advanced Techniques.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

**July 30-31, San Francisco — Software Maintenance Technology.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

## NMA Cancels Fall Meeting

**SILVER SPRINGS, Md.** — The National Micrographics Association (NMA) has canceled its Integrated Systems '81 Meeting and Exposition scheduled for Washington, D.C., Nov. 16-18.

The decision was reached by the NMA board at the Association's 30th Annual Conference and Exposition in Los Angeles. The cancellation was reportedly due to the number of similar shows aimed at the same market and set for about the same time. Attendance is diffused and exhibitors will suffer in an oversaturated geographic market, the association decided.

However, NMA's National Capitol chapter will continue to serve the local micrographics community by conducting its own annual equipment exposition in the spring of 1982.

More information is available from John Bidell, Director of Meetings and Expositions, NMA, 8719 Colesville Road, Silver Spring, Md. 20910.



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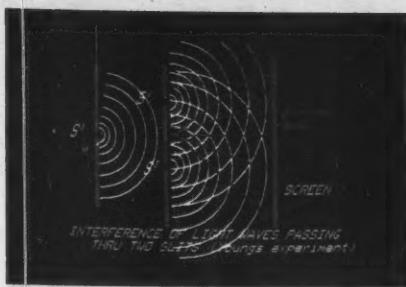
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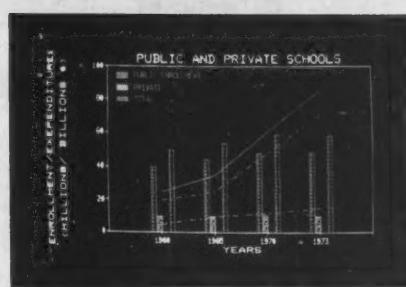
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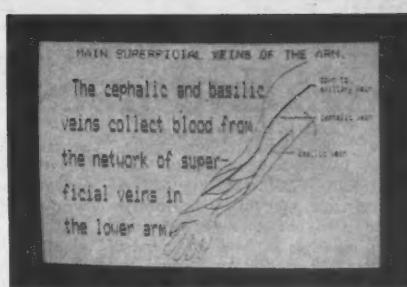
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Financial Plotting



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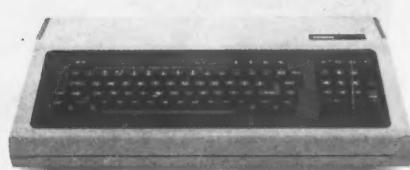
```

? COCHKIL/DOA
[1] +(C=PODA+DID=DAV)@OTRNS
[2] DOA+DAV|QDTJ)@O
[3] DOX(DQA)+OTRNS-?
[4] ?
SAVE

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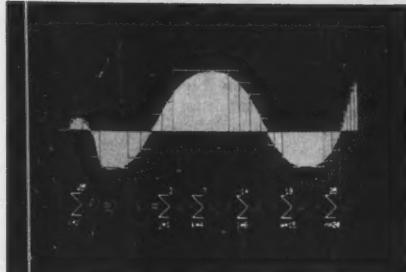
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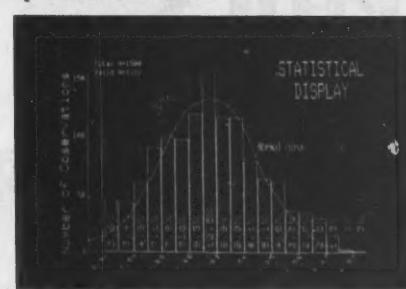
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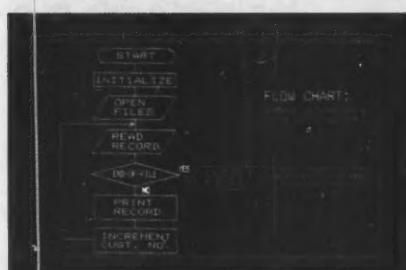
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3	-0.99	196	10.5
4	-0.40	281	21.5
5	4.83	238	11.5
6	0.56	144	11.5
7	-1.3	186	11.5
8	1.01	95	4.5

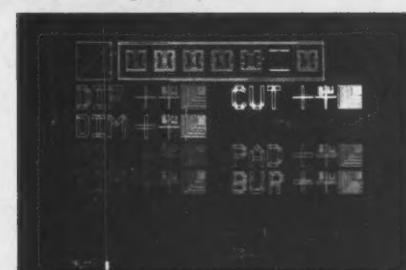
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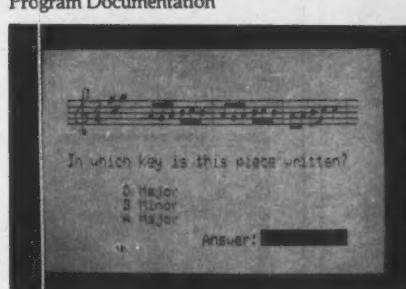
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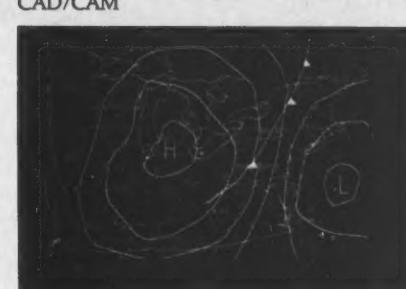
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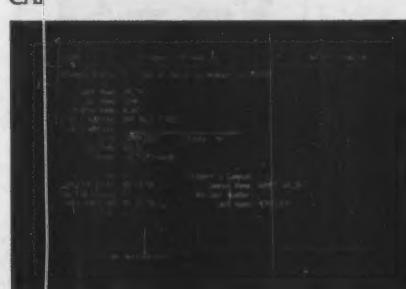
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# Asis Endorses Federal Information Institute

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Federal information policymaking activities are too scattered among mission-oriented agencies to have any serious influence on national planning for the information age, the American Society for Information Science (Asis) said last week.

Discussing legislation to set up a federal Institute for Information Policy and Research that would coordinate public and private sector activities, Asis Executive Director Samuel B. Beatty said the bill, introduced by Rep. George Brown Jr. (D-Calif.), is a "major legislative effort."

In his testimony Tuesday before the House Subcommittee on Science, Re-

search and Technology, the Asis representative joined a diverse group of private and public sector witnesses who wrapped up three days of hearings on the legislation. The bill would establish the institute within the executive branch of the government and also call for appointment of a presidential advisor on information issues [CW, June 1, June 8].

### Agreement Lacking

While most of the witnesses agreed the issues raised by the legislation are of national importance, there was little agreement on the best method for coordinating information policy and research activities.

No matter what mechanism is chosen, many witnesses stressed, its suc-

cess will depend primarily on greater interest in information-related subjects on the part of the President, Congress and the private sector.

Dale B. Baker, director of Chemical Abstracts Services, said "I am hesitant to place too much emphasis on an organization chart. What is important is the understanding and commitment of the individuals who populate the chart."

Beatty told the subcommittee "there is also a tendency within Congress, the executive agencies and even the public at large to view information policy questions too narrowly" in terms of specific technologies, products and institutions.

When these specifics are looked at separately "their role in the overall

information transfer process becomes obscured," he said, "and the long-range impact underestimated."

A high-level, joint private and public institute "would maintain a necessary focus on the overall information transfer process," Beatty predicted. "It would aid the Congress and the executive branch by researching the information issues surrounding important public policy questions."

Beatty suggested modeling the institute on the quasi-governmental Corporation for Public Broadcasting. The government, private and non-profit sectors "should bring together in the institute not only their research capabilities, but a sense of commitment and an infusion of funding from each," he explained.

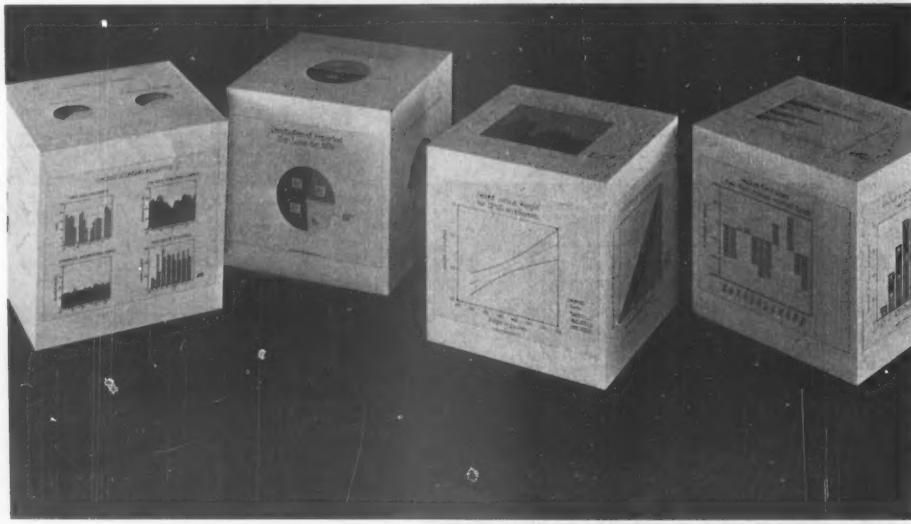
The ultimate goal of any mechanism, he continued, "is to have a real impact on policymaking." And the most effective way to do that, according to Beatty, "is to ensure that all interested groups who will be affected are intimately involved in the selection of topics for research, in conducting and monitoring that research and in participating in the implementation of that research."

With that in mind, Asis recommended the institute not have central policymaking, regulatory or enforcement powers. Otherwise its activities might have a chilling effect on related work in other parts of the government and in the private sector, according to the association.

Beatty also said he doubts "the feasibility or desirability of developing a single, monolithic national information policy."

In general, Beatty concluded, the proposed institute could fill the need to raise information policymaking above the mission-oriented agencies within the federal government and to involve the public and private sectors in "meaningful policy discussion" for development of national policies.

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## Converting Intangibles to Cash?

**Q** In order to be approved for development, an information systems project must yield a positive discounted cash flow over the expected life of the system. Those who make the decision are interested in the bottom line only. In order to obtain the bottom line, we must translate intangible benefits into dollar savings.

We have very little confidence in our estimate and are wondering if you could suggest a way to convert intangible benefits into tangible savings (dollars).

**A** In the past, we were able to calculate a reasonably accurate return on investment for simple transaction-based systems. The complex integrated systems of today make significant contributions to corporate profit, but over the long term and in subtle, less visible ways. The evaluation of the merit and worth of these projects is a subjective process that requires a knowledge of the tangible costs and benefits and a thorough understanding of both positive and negative intangible benefits.

The use of the dollar as a common denominator for all benefits and costs is an oversimplification of the evaluation task. The introduction of earnings figures for such intangible benefits as better customer relations or increased prestige serve only to compound the error in the "bottom line." Too often the bottom line is blindly accepted as gospel when in fact, half of the estimates are at best mush, and at worst, ridiculous.

When we reduce intangibles to dollars, we substitute bad estimates for the decision maker's better judgment.

A more realistic approach to evaluating information systems projects would be to accompany a net dollar figure for tangibles with narratives of intangible benefits and burdens. Give management credit for being able to assimilate subjective and objective input and make a rational decision.

If this approach is politically infeasible and the "bottom line" is a corporate requirement, try the Delphi method discussed in a previous Turnaround Time column [CW, Feb. 16].

**Q** I was recently appointed to a committee to evaluate computer-related curricula at our medium-sized university. Even though there are more computing science than mathematics majors, computing science is under the department of mathematics. A few voices have proposed a separate department of computing science, but the administration points to other computing science programs that have thrived in similar circumstances. Are we following the appropriate model for computing science education?

**A** Even though computer/computing science is relatively new, it is already a well-established and rapidly expanding discipline. Once a program has the faculty necessary to support a degree program, computing science should

be afforded department status.

Computing science curricula evolved not only in mathematics departments, but in physics, electrical engineering and other departments. In each case there comes a time when ties with the parent department should be dissolved for the good of the university and the people it serves. Computing science should have the opportunity for independent growth.

**Q** I am a well-educated deaf person, with a B.S. degree in data processing, 1975. After graduation, I married and moved to California. My lack of experience and handicap made it difficult to find a job. I finally got a job as an

accountant.

I now realize, after six years, that I still want a data processing job. Is it possible for me to get one? Should I go back to school? If so, what kind of school?

**A** Add a little effort to a good mix of experience and formal education (even though it is a little stale) and you should have no problem landing a job in data processing.

Although some technical review might be in order, I see no reason for you to return to school for the sole purpose of obtaining a position in DP.

Your eventual employer will probably provide the necessary formal

**Turnaround Time**  
By Larry E. Long



education and on-the-job training to update your knowledge and hone your skills.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, Box 880, Framingham, Mass. 01701.

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\*\*"All About EDP Media and Supplies," Datapro Research Corporation, September, 1980.

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## EDITORIAL

### Vendors in a Hurry

General Telephone & Electronics (GTE) recently announced an integrated data/voice switching system without a name or a price, based on parts still under development and not due for delivery until June 1982 [CW, June 15].

The announcement by GTE Telenet Systems — a Stamford, Conn.-based subsidiary of the telephone conglomerate — came on the heels of rival introductions by a few well-known vendors. What does such a rush to market accomplish?

Many manufacturers appear to have done this sort of thing — "unveiling" systems before they are field tested, around the time competitive systems are heralded — lest they seem lagging or lacking in a hot corner of the market.

At this point, only GTE Telenet Systems is well-qualified to speculate on how important its unnamed product will be in the hot market corner some observers dub the domain of "supercontrollers." These switching systems integrate flow of data and voice (and other media, in some cases) in a manner that consolidates control over disparate information processing functions, generally into the hands of a single department.

Other entrants in this corner include Datapoint Corp., Intecom, Inc. and Rolm Corp. Only Intecom, an Exxon Corp. affiliate, seems to have made many deliveries yet. It is too early to say what vendor may reign as champion in the early 1980s, or even whether any champion is possible.

The incentive for rushing a supercontroller to market appears great. GTE Telenet Systems' haste may make a lot of sense for that company and its product may turn out well, but the propriety of this sort of publicity ought to be questioned.

Users engaged in planning integrated networks, featuring the local loop environment for which supercontrollers are designed, need to know prices — if not names — for the products they consider implementing. Before serious consideration can be prudent, the product should run somewhere for a while under conditions similar to those planned by the user.

When vendors hold press conferences to "introduce" a system lacking name, price and a field testing history, the trade press naturally publicizes the event and many users stop in their tracks for a while to wonder what the event really amounts to.

Vendors worried about falling behind in a hot market area can always circulate a brief press release expressing their intention to eventually sally forth. But more fuss is unworthy of users' attention.

## DATA PAST

### Five Years Ago

June 21, 1976

WASHINGTON, D.C. — The General Accounting Office finally released its audit of the Social Security Administration's (SSA) computer operations which indicated the agency's DP needs could be met by its existing facilities.

As a result of the report, congressional pressure delayed until mid-July the SSA's plans to award bids up to \$48 million for construction of a \$69 million computer facility and office building known as "Metro West."

Computerized Criminal History program because information exchange cannot work effectively without a message-switching capability, U.S. Attorney General Edward H. Levi said in a speech here.

### Ten Years Ago

June 23, 1971

WASHINGTON, D.C. — Warning that "the overwhelming power of the Federal Government to expose must be held in check," U.S. District Court Judge Gerhard A. Gesell ruled here that the Federal Bureau of Investigation must stop distributing arrest records from its files outside the government except for law enforcement purposes. The practice could limit an individual's freedom, he said.

SAN ANTONIO, Texas — The Federal Bureau of Investigation (FBI) requested permission to terminate its



'Your Honor, these of course only show how much she wanted to win the competitive struggle ...'

## LETTERS

### Survey's Faults

The June 1 edition of *Computerworld* carried a report on a Data Decisions, Inc. survey of CRT terminal users. Our company was identified as having the lowest rated products among those users polled. In the interest of setting the record straight, I would like to make the following comments.

First of all, the survey appeared considerably biased toward the IBM user community, as indicated by the large number of IBM-type display terminals included in the survey. As an example, there were almost seven times as many Trivex terminals evaluated as Beehive terminals. The Raytheon PTS 100, ITT Courier 270 and IBM 3278 models also dominated the terminal population evaluated.

I raise the IBM orientation issue because we have only recently (March) begun a selling effort directed at the IBM mainframe user. Our traditional business comes from OEM customers that integrate the basic product we manufacture (usually customized for each buyer) and resell it as part of a larger system. Our success with this class of customer is a matter of public record.

Second, our company has shipped almost 100,000 terminals during the years we have been in business and to rate us on the basis of the performance of 44 units of unspecified model identification seems, to us, to be stretching the limits of statistical credibility. I believe readers will share my doubts that a sample size of one out of 2,500 can provide any true measure of satisfaction or dissatisfaction.

Finally, although we would naturally have preferred to be ranked No. 1 by the survey, we are pleased to know that our 5.8 overall average rating was only .2% short of a very good

rating. Since even the highest rated terminal, the HP 2640, was not rated higher than very good, we feel we are in pretty good company in spite of the survey shortcomings.

John C. McPhail  
Vice-President  
Marketing & Sales

Beehive International  
Salt Lake City, Utah

### Lawyers and DP

Kudos to *Computerworld*. It was one of the first "computer" newspapers to publish an article that discussed computers in the law office ["Word Processing Seen Answer for Lawyers' Heavy Schedule," CW, May 18].

Vendors have a lucrative market in attorneys and should open their eyes and ears to attorneys' unique needs. This article addressed two often neglected topics: litigation support and minicomputers in the law firm. Litigation support is invaluable to any law firm that wants to stay profitable.

Minicomputers are popular because they make automation affordable to small firms and allow them to compete with the big guys. Now all we need is someone to sell the stuff. As James Bush pointed out, vendors must be able to communicate DP jargon to the lawyer in legal terms. A new breed of salesperson is needed.

Andrea Hieken  
Legal Assistant  
Alscherler & Grossman  
Los Angeles, Calif.

*Computerworld* welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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## HUMAN CONNECTION/Jack Stone

## Text Gives Tips on Handling Problem DPers

As an important move to improve personnel management in our business, computer center managers and supervisors should put down their soldering irons and coding pads long enough to study what I believe may turn out to be a classic textbook in the field of industrial relations: *Problem Employees: How to Improve Their Performance*, written by two consulting psychologists, Drs. Peter B. Wylie and Mardell S. Grothe (published by Pitman Learning, Inc., 6 Davis Drive, Belmont, Calif. 94002).

Although the text has general application in American industry, it's right on target with respect to handling the problem DPers whose presence has been known to grace a center at least once or twice in times past. How often have you felt frustrated or depressed, or even overwhelmed, while attempting to deal with difficult DPers — those who are geniuses at systems work but have insufferable personalities, hostile attitudes or poor work habits?

The authors state their position on this matter early in the book: "Problem employees are often very talent-

ed, competent people with more than enough ability to perform well on the job. But they can still be problem employees. Their bosses often complain about bad attitude, poor motivation or the inability to get along with others. Many managers seem more concerned about factors such as these than the employee's technical ability to do the job."

One aspect of the text which should be quite appealing to center managers is its basic structure: the authors have devised a 10-step "systems approach" to dealing with problem employees and presented it in a straightforward manner. Here is a brief summary of the approach:

1. *Analyzing employee performance*: techniques for shifting your attention from problem behaviors to behavior goals.

2. *Asking for a meeting to discuss work performance*: some socially acceptable methods for inviting the employee to come to your office.

3. *Beginning the interview*: Maximizing employee involvement and cooperation and minimizing your discomfiture, with notes on "how to lis-

ten."

4. *Finding out how things are going*: gathering data from the employee. The chapter includes an example in the form of a structured walk-through.

5. *Getting your employee to do a self-analysis*: how to encourage a self-appraisal without putting the employee on the defensive.

6. *Presenting your analysis of employee performance*: identifying areas where performance is effective and where there should be improvement, plus notes on "how to present performance ideas effectively and get your message across."

7. *Negotiating the performance agreement*: defining specific tasks on which the employee is going to work in the short range to improve performance.

8. *Closing the interview*: how to avoid antagonizing the employee altogether.

9. *Follow-up*: procedures for conducting follow-up meetings to monitor and relate progress.

10. *"What do I do if none of this stuff works?"*: The options that are avail-

able, assuming that you've done steps 1 through 9 to the best of your ability, which include: firing, transferring, restructuring an employee's job and neutralizing an employee.

An additional comment on this step: There are many, many DP managers and supervisors who jump steps 1 through 9 and go to step 10 so they can avoid what they feel will be an ugly confrontation and possible backlash. One of the major features of the book is a rational explanation for why all 10 steps are mandatory, which implicitly provides interested managers with higher levels of confidence in approaching the problem employee in an intelligent, controlled way.

A second attractive aspect of the book is its style of presentation — concise, pointed and clear. In addition, the methodology is logical, comprehensive and practical. The material is simple to understand, easy to apply and filled with illustrations, checklists and forms to be completed, all of which tend to encourage reader action.

## TAYLOR REPORT/Alan Taylor

## Programmer Power Yields Surprise Bonuses

The impact of increased programmer power in Forth languages came out rather dramatically during the recent Forth Standards Conference in Rochester. A paper by Kim Harris dealt with the question of transportability and, in particular, the problems caused in transporting a solution from one hardware system to another because the conditionals and loop controls simply did not match.

Harris' solution was simple, straightforward and effective. Instead of trying to take each of the standard constructs of various types of loops, such as BEGIN ... UNTIL, he looked at what loop controls were.

He then developed a group of eight

primitive instructions (based on BRANCH, MARK and RESOLVE) the programmer could use, for his own particular task, to set up the exact type of looping and loop controls that were to be compiled and run in the full system. These primitives defined whether branches were conditional or unconditional, forward or backward and dealt with the compiler actions required of both marking forward or backward branch addresses so that they could be resolved later.

A Forth programmer then writes them as a part of his program into a standard or special configuration of controls and uses them. This addition doesn't take much room, nor-

mally only one screen, as noted in Figure 1.

With this use of programmer power to define effectively the particular types of controls a programmer is anticipating having available, the whole system becomes transportable in a way few systems currently are. Such a result is good, but not really unexpected.

### Dividend Coming Up . . .

However, Harris' actions went further than simply duplicating the necessary types of control structures. Instead, he started utilizing the same primitives to produce specialized control structures that would not normally be part of language systems.

Two such techniques were illustrated in his paper: One was a series of steps where, if any of a set of conditions were false, all succeeding steps

and their actions were skipped. Another was a loop with many possible exits, one for each time a condition was found false (see diagrams).

With the latter, Harris used his creative primitives to make small changes in the BEGIN, WHILE and REPEAT definitions that have been created for the original set of transportable control structures, renaming it at the same time.

The problem of transportability looks a lot cleaner now than trying to move between two nearly identical but frequently different sets of control structures. The system does not take up very much space and is efficient both at compile time and when executed.

In addition, control structures that help loops to be highly efficient can be created by almost any Forth programmer and can be added to his

(Continued on Page 28)

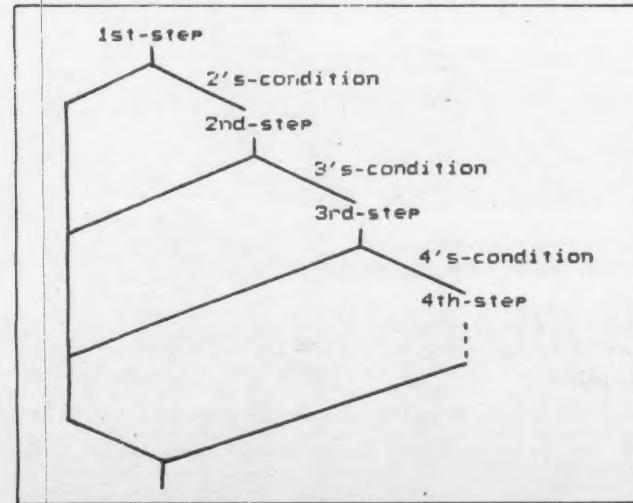


Figure 1. Multistep Loop

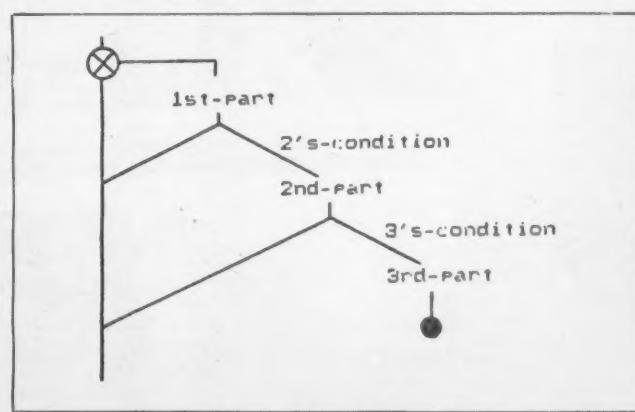


Figure 2. Multiexit Loop

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Compare with the typical matrix printer that can sound like a blender full of ball bearings, and you have the Number One reason why your next printer will be an INFOSCRIBE 1000.

Even printers advertised at 56dB are a full 2 dB higher than ours. (Remember, every 3 dB up doubles the noise.)

## A New Generation Printer

If INFOSCRIBE 1000's purr were its only benefit, you should still buy it for the sanity of your office staff. But it happens that INFOSCRIBE 1000 is also the most feature-packed, the most beautiful, and the most economical printer in its class.

## Graphics Galore

INFOSCRIBE 1000 doesn't print characters only. Under software control it produces charts, diagrams, graphs, signs, anything within a vertical and horizontal resolution of 70 dots per inch. Now we're talking about a capability that can enhance management presentations, sales reports, even technical documents.

## Format Flexibility

INFOSCRIBE 1000 can produce data processing quality characters at 10, 12, or 16.5 characters per inch, or correspondence quality characters at 10. You also get subscripts and superscripts in any selected pitch, double-wide printing, true lower case descenders, and true underlining.

In addition to two different character sets stored in the printer, a third character set can be downloaded from the host computer. This offers a total of 288 different characters that can be selected on a character-by-character basis.

## Gratifying Throughput

There's more to INFOSCRIBE 1000's speed than a nominal 180 characters per second. High-speed paper movement with vertical and horizontal tabbing, plus bidirectional printing with logic seeking in both directions gets a lot of work out of the machine. And that's equivalent to having a faster computer.

## Unmatched Elegance

It's almost unfair that INFOSCRIBE 1000 is also the industry's best looking matrix printer. Slim, sleek, graceful, it makes those machines with the visible viscera look like remnants of early experimental days at Menlo Park. INFOSCRIBE 1000 is completely enclosed, sealing dirt out while sealing noise in. Its controls use membrane switches, so not even knobs or buttons break its sculptured exterior.

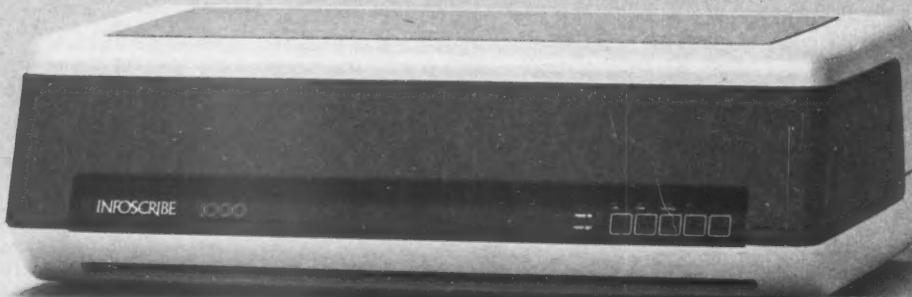
## Demand the INFOSCRIBE 1000.

Is there a single reason why you should have any printer but the INFOSCRIBE 1000? At \$1,825 in singletons (substantially less in OEM quantities), INFOSCRIBE 1000 becomes mandatory for your system.

Insist on it from your system specialists. And if you are buying a first-time computer, no matter what make, ask for the printer that is setting a new standard: INFOSCRIBE 1000.

Get full details from your nearest Infoscrite distributor/representative. Or talk to your computer dealer. If he doesn't handle Infoscrite yet, he will.

\*Contact Infoscrite for an abstract of the independent testing laboratory report.



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Overseas Distributor Inquiries Welcome

## An Exaggeration

The suggestion that "Big Net Users Fear Deregulation" [CW, June 8] exaggerated the position taken in my speech. In fact, we believe a competitive market will provide more long-term technological progress and price predictability than an endless transition period.

As I said, "What large customers want most from deregulation is an end to the already 10-year-old debate among Congress, the courts, the federal regulators and the states." Time to get on with it.

Susan L. Gordon  
Director of Policy Research  
The Research Board, Inc.  
New York, N.Y.

## ISM Not the Problem

The letter from Charles Volkstorf that appeared in the June 8 edition of *Computerworld* deserves explanation. As an unauthorized spokesperson for the University of Massachusetts Medical Center, Volkstorf was expressing his personal frustration resulting from a difficult period in which we added to our hardware configuration.

He implied in his letter that ISM was the cause of our problem. This is not factually correct. As a matter of fact, we have been successfully running ISM's operating system for more than two years. Consequently, we cannot attribute what we experienced to ISM and now that we have finally attained a stable situation, we are planning to install the latest version of ISM's operating system.

Dennis P. L'Heureux  
Acting Associate Vice-Chancellor  
for Information Resources  
University of Massachusetts  
Medical Center  
Worcester, Mass.

## More on Report Writer

I applaud Frank C. Fillmore Jr. for his recent article "Cobol Report Writer Pays Big Dividends" [CW, May 25]. He did an excellent job of documenting the advantages and benefits that can be reaped from the use of Report Writer as well as refuting the common excuses given for not using it.

For those DP managers who are genuinely interested in improving the productivity of their Cobol programming staff and for the professional programmer who shares this concern, may I make a recommendation. For a modest investment of approximately \$13, you can purchase the text *Report Writer: A Cobol Feature That Can Improve Productivity*, by Steve Eckols.

Eckols has written a very concise yet informative text that contrasts conventional Cobol programs with programs written utilizing the Report Writer feature.

He has also included lists of terminology, behavioral objectives, problems and solutions at the end of each chapter. Seven complete Report Writer program listings are presented which cover the major types of reports generated by DP staffs.

Everything you ever wanted to know about Report Writer but didn't know where to look for an answer is found in the 103 pages of this text.

If yours is an ANS Cobol shop and you are concerned about productiv-

## LETTERS

but are not taking advantage of the Report Writer feature, may I encourage you to at least "try it — you'll like it."

Jerry E. Gailey  
Programmer/Analyst  
Western Zirconium, Inc.  
Ogden, Utah

## Welcomed Exception

I was appalled at the PPG Industries corporate computer director's letter to the editor stating that *Computerworld* is "too large to fit in his briefcase" and "has too much advertising" [CW, May 25].

In this inflationary age of rising prices, reduced quantity and diminished quality, CW is a welcomed exception. The table of contents permits selective reading and a quick reference for the busy executive.

The excellent coverage of all the interrelated aspects affecting data and word processing for the total spectrum of users and the "In Depth" special reports are of exceptional quality for a weekly publication. Any attempt at special publications for special interests would defeat the need for total industry information.

A rapidly changing technology such as DP mandates that those in a planning and decision-making process always be aware of new tools, techniques and alternatives to solve

information processing needs in the most expedient and cost-effective manner. Advertising plays a vital role in keeping all of us informed and contributes to lower subscription rates.

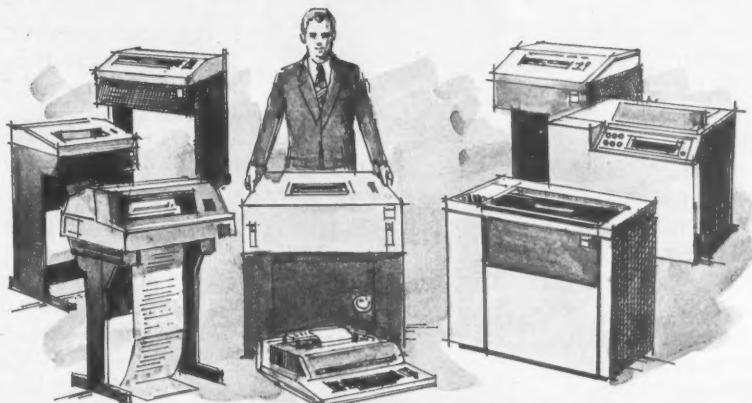
With a background in applications programming, general systems analysis, system generation and maintenance, in-house training and standards, I found a broad source of DP knowledge was and still is very helpful.

As an honorable and ethical DP recruiter now, I am also pleased with the editorial stance and publicity CW has given to unscrupulous recruiting practices.

Keep up the good work!

Pete Lynd  
Exclusive Searches  
Dallas, Texas

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## Allowing for Change

You are to be congratulated for printing James Martin's "An End User's Guide to the Data Base" [CW, May 4], as indeed is the author himself. However, there was an implication in the article that though the organization data needs are in dynamic evolution, the organization itself is stable.

The dynamics of an organization to some extent reflect the dynamics of the general economy and society. I will postulate, and I will be surprised if many will disagree, that the economy and society are boiling to an extent where it is a brave man who can predict the future.

My argument is that any system that does not allow for accelerated change in the organization is not only doomed to failure, but where the system is essential for the success

of the organization, that system could be the ultimate cause of the organization's failure.

"So what?" would be the rejoinder. I believe that data and information, while of fundamental importance, are less fundamental than an analysis of an organization's activities and the design of an organization's human structures, together with the accountabilities and responsibilities of those actions being specified in such a way that the organization can be changed both readily and knowledgeably.

Given that, we can then buttress such a structure with data servers, information servers, communication and data/information manipulation

and processing.

As I have argued previously, the characteristic of the human organization that distinguishes it from that of DP is that its component blocks are human beings, adaptive elements that adapt to their perception of need.

To summarize, James Martin is painting the right picture with the right message, but the canvas needs to be bigger than data management.

W.J. Talbot

Cheshire, England

## In the Short Term

Kim Jones' article on system generators [CW, May 25] was informative,

but never explained his statement that generators are best for long-term projects.

Is it because once developed, the code generated is difficult to change? Even though the generator cuts development time for the programmer, is he too busy to respond to short-term project requests from users?

One application generation technique not mentioned in Jones' article is the one used by our product, Aims. Rather than create code, Aims saves application designs as data files. This permits extensive modifications without any risk of introducing bugs through code changes.

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Glen Watkins  
Vice-President  
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## No Imitator

Let it be known that the Data Processing Management Association (DPMA) has had a code of ethics all along and is not imitating anyone as was stated by James Schannahan in a letter to Computerworld [May 25].

I have been a member of DPMA since 1964 and the DPMA code of ethics is on my certificate of membership.

John T. Sargent  
Assistant Secretary  
And Manager of Programming  
Volunteer State Life Insurance Co.  
Chattanooga, Tenn.

## Power Gives Some Surprises

(Continued from Page 25)  
 repertoire of efficiency-seeking algorithms with little or no problem. No longer are the compromises of providing only a limited number of control structures necessary. In addition, no longer do programmers, moving from one system to another, have to remember the idiosyncrasies of the compiler design they are currently using or why parts of techniques that worked perfectly well somewhere else are now of no value, or even worse, dangerously unstable.

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## VCI 'SMF Express' Manages Data Under OS, MVS

CHERRY HILL, N.J. — Value Computing, Inc. (VCI) has announced SMF Express, a data management system for IBM's System Management Facilities (SMF), which is available to data centers running IBM's OS/VS1 operating systems, including OS/VS2 MVS, MVS/SE2 and MVS/SP. SMF Express automates the dumping, inventory and retrieval of SMF data, VCI said. The system transfers the contents of eligible SMF source files to tape, storing multiple files per volume.

The system maintains an inventory by date and time of the data it has stored, the vendor said, allowing users to retrieve SMF records without specifying their location. Historical SMF data can be retrieved for multiple jobs in one execution of the program, according to VCI.

The SMF Express system eliminates the manual copying of SMF data to tape and subsequent recording of its location, the vendor said, and thereby reduces the chance of error. The system includes duplexed dumping and dump verification options, which can be set at installation time to increase security, according to the vendor.

SMF Express also produces reports, including a listing of selected SMF records, a complete audit trail of all processed control statements and a display of the master index to the history files.

SMF Express can be licensed for about \$10,000, VCI said from 498 N. Kings Highway, Cherry Hill, N.J. 08034.

## Security Updated For CICS Site

SUNNYVALE, Calif. — Release 3.0 of Secure/CICS, an on-line software security product for use in IBM's CICS environment, is now available from Boole & Babbage, Inc.

The new release of Secure/CICS reportedly incorporates file protection and program features. It monitors and controls the use of information and resources in CICS data communications networks, the vendor said.

With Release 3.0, Secure/CICS provides users with file security that enables them to specify protection for accesses made to the files defined in CICS' File Control Table, the vendor said.

The product's program security features reportedly permit the user to specify protection for the access and execution of programs named in CICS' Program Processing Table.

Implementation of protection for each of these features can be defined on the operator, terminal and transaction levels, according to Boole & Babbage.

Secure/CICS is designed to operate on IBM 370, 30 series and compatible mainframes under all VS operating systems in a CICS/VS environment. Its purchase price is \$18,800, including the first year's maintenance.

Thereafter, maintenance costs \$3,760 per year, Boole & Babbage said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

## Nixdorf Brings Out Interactive T/S, System Scheduler For DOS Machines

RICHMOND, Va. — Interactive time-sharing software and an automated system scheduler for IBM and plug-compatible mainframes running under DOS have been introduced by Nixdorf Computer Software Co.

However, the company is unable to give prices for the products or even to indicate approximate price ranges at this time, but said it will release this information in the near future.

Fluent is an interactive time-sharing package for equipment running under IBM's DOS/VSE and under the Edos/VS and Edos/VSE operating systems developed by The Computer Software Co., which has been acquired by Nixdorf. Fluent includes an editor that a Nixdorf spokesman said has full-screen IBM 3270 support and dual-screen mode options.

Outlook, the second package introduced, reportedly provides automated system scheduling for the IBM 360, 370, 4300 and plug-compatible systems running under DOS-based operating systems.

Outlook was designed to automate data center planning and scheduling in the DOS marketplace, the vendor said.

Fluent's file system is said to provide a hierarchical structure of directories and files that contain source code or executable text. This system provides for direct-access storage device independence and runs on either count key data or fixed-block architecture devices, according to Nixdorf.

Fluent reportedly provides a program—*(Continued on Page 30)*

## Cincom Adds Central Version Of Total DBMS for NCR Users

CINCINNATI — Cincom Systems, Inc. has added a central version of its Total data base management system (DBMS) for NCR Corp. VRX operating systems.

The product, VRX Total Central, reportedly enables users to have many tasks concurrently updating the same data base files. Because file access is through the central Total DBMS, memory and paging requirements are reduced, Cincom said.

Operating as a stand-alone job, VRX Total Central is said to communicate with a variable number of user jobs through the VRX Inter Job Queue. The user gains all of the operating features of Total Basic and the additional features associated with central mode operation, the vendor said.

Series 80 VRX Total Central is available with Release 5 and above of the VRX operating system and reportedly includes advanced features to enhance memory man-

agement, performance and integrity.

Fully compatible with the VRX and N-Series of NCR Total Basic, VRX Total Central provides concurrent read/write/add/delete functions for the variable number of user jobs, according to Cincom. Function concurrency will proceed to the record level for concurrent update protection, the vendor added.

VRX Total Central is said to provide multithreading, with reentrant and shared code, as well as automatic element list binding. It includes beginning and end of transaction facilities for transaction coordination with terminal communications systems such as Cincom's T-Com, the vendor said.

The price for VRX Total Central is \$38,500, including first-year usage and maintenance fee, Cincom said from 2300 Montana Ave., Cincinnati, Ohio 45211.

## Support Contract Set for IBM Users

FRAZER, Pa. — Carta Associates, Inc. has announced a program of support on a contract basis for IBM operating systems and program products.

System Level Support (SLS) was designed to meet every system-level programming requirement within a specified fixed time and for a contractually fixed cost, according to Carta Associates.

The SLS fee schedule covers long-term requirements, which are contractual annual systems programming support for IBM VM/370 and CMS, DOS/VSE, DOS/VS, OS/VS1, CICS and other operating systems and program products.

Short-term services can include designing and planning for the new installation, *(Continued on Page 30)*

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- ALARM — Hardware Reliability Measurement System
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**SOFTWARE & SERVICES**

## Query Language Featured

# Gemini Offers DBMS for Series/1

ENGLEWOOD, Colo. — Gemini Information Systems, Inc. announced Ddquery, its data base management system (DBMS) for the IBM Series/1 minicomputer.

Ddquery includes a query language, report writer and transaction processor and reportedly optimizes file space and supplies linkages between related data items to facilitate data access.

Its Schema subsystem is used to define the data base and establish relationships, the vendor said. Its Query subsystem is said to allow the user to interactively enter, retrieve, modify and report data using more than 40 English-like commands.

Ddquery includes a report writer the vendor claimed is

capable of reporting data from as many as five data sets and a transaction processor that allows the user to design CRT terminal screen forms for data input, modification, display, processing and data set updating via a high-level language called Transact.

The screens also may include automatic data type,

range and required field verification, the vendor added.

The system reportedly is operational under the EDX operating system and requires a minimum 128K bytes memory. License fees for Ddquery begin at \$15,000, the vendor said from 5500 S. Syracuse Circle, Englewood, Colo. 80111.

## DOS/VSE Program Gives Vtoc File Track Total

SPRINGFIELD, Mo. — Philinda Software, Inc. has announced a program product for DOS/VSE users that gives users of the company's Vtoc display utility total tracks in the file and beginning and ending extents in

both tracks, according to the vendor.

PSIVTOCB also lists file identification, extent sequence, extent type and creation and expiration dates, the vendor said.

PSIVTOCB leases for \$95/year and carries a one-time charge of \$375, the vendor said. Philinda Software, Inc. is based at 527 W. Kerr, Springfield, Mo. 65803.

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## Tools Added By Nixdorf

(Continued from Page 29)  
mable user interface through a command language that operates on members of the file system. The interpreter of this language is termed the "shell," and data stored in the file system is said to be manipulated through the shell procedures.

Major features of the Outlook system include on-line load and update screens to capture the total job requirements of any operation from logging of input data through final delivery of reports.

Fluent reportedly will be available by the end of the year; phase one of Outlook is scheduled for delivery in the third quarter of 1981.

Nixdorf Computer Software Co. is located at 6517 Everglades Drive, Richmond, Va. 23225.

## IBM Users Get Support

(Continued from Page 29)  
installation support, capacity planning and monitoring services and, on a custom basis, designing and installing communications networks.

Carta Associates said it guarantees these support services unconditionally.

The price range for SLS can range from \$750/mo to \$2,250/mo, depending upon the number of products supported, the company said.

Carta is located at 640 Lancaster Ave., Frazer, Pa. 19355.

## Tool Tailors IBM's Mapics To Process Control

ATLANTA — A software product that reportedly tailors IBM's Manufacturing Accounting and Production Information Control System (Mapics) to the process control industries and a series of week-long courses on Mapics were announced here by GMD Systems International, Inc.

The Mapics system runs on IBM System/34. The enhancement to Mapics developed by GMD is called Stock Location and Lot Management System (Slalom).

The vendor described it as the first phase of tailoring Mapics specifically to the process control industries. Slalom also is said to provide the ability to stock inventory in multiple locations within a warehouse.

The five education courses are designed for middle management and the project

team implementing Mapics-based manufacturing control systems. They reportedly cover all areas of implementation from start-up tasks to use of each application.

### Separate Course

A separate DP course also is conducted for installation managers and DP professionals interested in studying the internals of the Mapics system, the vendor said.

The week-long courses generally cost \$650. Slalom is available for a one-time charge of \$8,000. Central support and multilocation discounts are available, according to the vendor.

GMD, which was founded by five ex-IBM manufacturing specialists who were involved in the design of Mapics, is located at Suite 140, 6195 Barfield Road, Atlanta, Ga. 30328.

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## Megaminis Get Support Contract

OCEANPORT, N.J. — Perkin-Elmer Corp. has announced a fixed price software support contract for users of its 32-bit Megamini computer systems.

The contract was designed for users who wish to protect their investment in state-of-the-art software and maximize system uptime, the vendor said.

Support is provided by a field network of systems analysts backed by the company's Software Services organization.

Price information on the contract varies with system use and is available from Perkin-Elmer Corp., 2 Crescent Place, Oceanport, N.J. 07757.

## Message System Out for System/34

WINTER PARK, Fla. — Software that reportedly allows IBM System/34 users to send full screen messages to multiple workstations and other users has been announced by Westmoreland Systems, Inc.

The Message Sending System stores messages on disks and can be retrieved and modified by the sender or receiver.

The system is priced at \$100 and is also offered as part of a Programmers Utilities package for \$500 from Westmoreland Systems, Inc., Suite J, 228 Park Ave. N., Winter Park, Fla. 32790.

## Omnex Offers 'Sub-Device' For RT-11, TSX-Plus Users

PALO ALTO, Calif. — The Sub-Device software enhancement package, which consists of a handler and a utility program for users of Digital Equipment Corp.'s RT-11 and S&H Computer Systems, Inc.'s TSX-Plus operating systems, was unveiled here by Omnex Corp.

Sub-Device separates files by project, user, program version or other definition and gives the user advantages similar to those gained with the subdirectory structures found on larger operating systems, the vendor said.

It reportedly enables users to create, use and maintain special files that

contain a directory, volume label and files. Each special file (Sub-Device) reportedly can be used as though it were a DEC RT-11 directory-structured block-replaceable device.

The Sub-Devices were described by the vendor as files that can be placed on any random-access dictionary-structured device. They also can be images of physical devices such as floppy disks, allowing rapid access to a working space containing the contents of a slower physical device, the vendor added.

The Sub-Device package is available on floppy diskettes for \$200, the vendor said from 801 E. Charleston Road, Palo Alto, Calif. 94303.

## On-Line 'ESP' Fits System/3

DARIEN, Ill. — An interactive, on-line inquiry software package for the IBM System/3 Model 15D was introduced here by Financial Systems and Services, Inc.

The Executive Secretary Package (ESP) is an inquiry facility for on-line systems under IBM's Communication Control Program.

Any file in the system reportedly can be made available for user inquiry and report generation by a one-time definition of the file and its Volume Table Of Contents entry.

A user creates an inquiry by choosing the fields to be displayed and the sequence in which the data is to be viewed, the vendor said.

ESP is available for a 30-day free trial. It has a one-time license fee of \$1,900 or 12 monthly license fees of \$190 including free installation, according to the vendor at Suite 214, 805 Plainfield Road, Darien, Ill. 60559.

## Vehicle Servicers Get Accounting Aid

BOULDER, Colo. — An accounting system designed for service stations, car washes, truck stops and gasoline convenience stores with IBM 5110 and 5120 processors has been announced by Gunbarrel Software Systems Co.

The Guss 1000 package includes accounts receivable, accounts payable, daily sales analysis, general ledger, payroll and inventory, according to the vendor.

Guss 1000 is priced starting at \$1,000 and up per module or \$6,000 for all five. Gunbarrel Software Systems Co. is at 6500 Lookout Road, Boulder, Colo. 80301.

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### IBM 5120 to System/34 Basic Conversion program

Creates System/34 Basic language source code from IBM 5120 Basic Source.

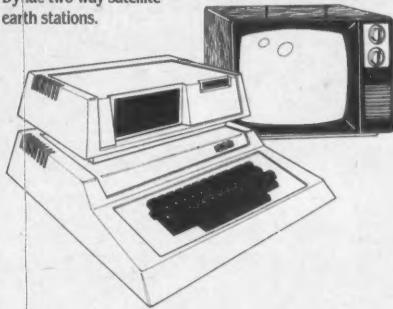
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# Ohio Scientific's IBS-NET™ provides distributed processing at microsystem prices.

Ohio Scientific's new Integrated Business System Network brings the benefits of distributed processing and advanced data communications to the smallest and most cost conscious business applications. In its fully implemented form, it can provide "office of the future" capabilities to small businesses, branch offices, and departments of larger companies which rival the most exotic mini and mainframe based systems.

IBS-NET™ places small economical state-of-the-art processors at each user's work station. Several work stations are clustered around a data base processor which provides large fast access file storage and sharable resources such as word processing printers and remote communications channels. Several clusters can be networked together and/or tied to existing computer facilities. Local communications are handled by low cost, high speed cable links and remote communications can be handled by a broad range of M/A-COM communications technologies including cable, fiber, microwave and Dynac two-way satellite earth stations.



## End User Benefits

Using standard IBS-NET™ hardware and software, a small to medium sized office can be equipped with personalized work stations which have the following capabilities:

### Distributed Word Processing

### Electronic Mail

### Modeling and Financial Planning

### General Information Retrieval

### Accounting including AR/AP, GL and Payroll

### Order Entry and Inventory

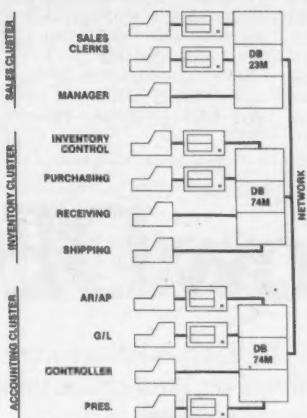
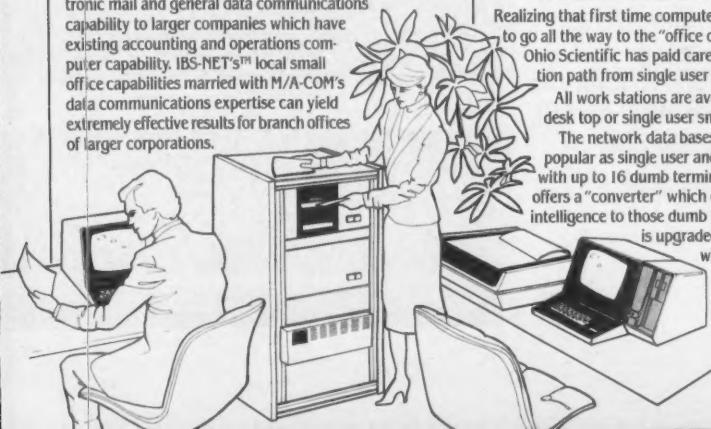
### Remote Data Access

### Stand Alone Operation Capability

Managers utilize the electronic mail, modeling and planning and general information retrieval features of the data base manager (which can access accounting and operations information).

Secretaries utilize word processing, electronic mail and information retrieval.

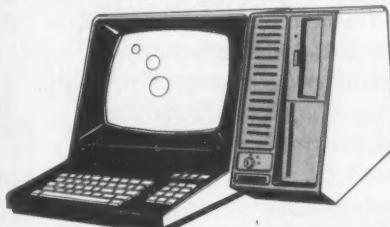
Staff and operations personnel make use of the "standard" accounting and operations modules as well as the word processing and communications features. IBS-NET™ provides "total capability" to the small office that does not have established EDP capability. It can provide an extremely capable and cost effective "Intelligent terminal front end" with intrinsic word processing, electronic mail and general data communications capability to larger companies which have existing accounting and operations computer capability. IBS-NET™'s local small office capabilities married with M/A-COM's data communications expertise can yield extremely effective results for branch offices of larger corporations.



## Versatility & Expandability

**Work stations** — Ohio Scientific offers a broad range of work stations ranging from ultra low cost "personal type" desk top computers through several medium priced integrated intelligent terminal models to a 32 bit processor based system with a local 5" hard disk.

**Data Bases** — Ohio Scientific's popular field-proven Challenger hard disk computers with 14" Winchester hard disks are the "core" of the data bases. Current models provide 37 or 74 megabytes of usable data base storage. Hard disk backup is via the network and/or tape cartridge or IBM compatible 1600 BPI mag tape<sup>1</sup>. The Challenger's unique multi-microcomputer architecture allows it to run Ohio Scientific's ultra high performance 65U operating system via its internal 6502 or the C/PM and MPM<sup>2</sup> operating system via its internal Z-80. A new CPU expander card adds either or both the 16 bit Z-8000 and 32 bit 68000 processors which execute UNIX<sup>3</sup> and other mini-maxi operating systems.



## Upward Expandability

Up to 16 work stations can be clustered around a central data base and several data bases can be connected locally, all using very inexpensive high speed cable links. Remote links via several protocols give the system virtually unlimited interconnect capability.

## Downward Compatibility

Realizing that first time computer users may be hesitant to go all the way to the "Office of the Future" in one step, Ohio Scientific has paid careful attention to the migration path from single user to network configurations.

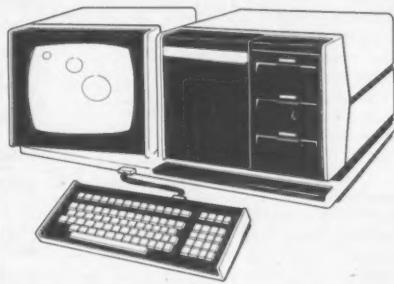
All work stations are available as stand-alone desk top or single user small business systems.

The network data bases are currently very popular as single user and Timeshare systems with up to 16 dumb terminals. Ohio Scientific even offers a "converter" which economically adds intelligence to those dumb terminals when the system is upgraded. The end user can start with a small single user system, later add time-sharing and ultimately networking.

## Software

The base operating system which provides the highest throughput is OS-65U, which is upward compatible from single user to timeshare to networking. OS-DMS-PLUS is the system's turnkey data base manager with optional network compatible modules including a word processor, DMS-Planner, an electronic mail system and a full set of basic accounting and operations modules including A/R-A/P, GL, Payroll, order entry and inventory. DMS-PLUS includes general entry, editing, arithmetic and report writing capabilities. It is compatible with Microsoft BASIC making it powerful and simple to use for software expansion and enhancement.

Suitably equipped work stations and data bases can also run C/PM (single user) and MPM<sup>2</sup> (multiuser), a popular microcomputer operating system, and Microsoft's XENIX<sup>4</sup> operating system for the Z-8000 which is a UNIX<sup>3</sup> compatible operating system enhanced for business applications.



## Real? Or Futures?

Ohio Scientific has delivered hundreds of OS-65U Level 3 local networks in the last 2 years and tens of thousands of desk top, single user and hard disk based computers over the last 6 years.

The network data bases, single user and desk top systems and the local network data operating system are all field proven.

What's new is network compatible turnkey applications software, the ability to use our lowest cost desk top computers as network stations, 16 and 32 bit processor expansion compatibility, and the associated XENIX<sup>4</sup> operation system.

Most importantly, Ohio Scientific has recently become a wholly owned M/A-COM subsidiary with the resources and communications technology to make your IBS-NET™ installations a lasting success.

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See an IBS-NET™ and our full line of desk top, single user and Timeshare systems at NCC Booth 2303 and Comdex East Booth 1526.

(1) Tape backup units are available from Alloy Engineering.

(2) C/PM and MPM are registered trademarks of Digital Research.

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## DS990 Gains Bubble Support

AUSTIN, Texas — Texas Instruments, Inc. has introduced Bubble Memory Terminal Support (BMTS), a software package for its TI DS990 family of computer systems.

BMTS reportedly facilitates data transfer between a TI DS990 host computer and any TI bubble memory ter-

### Screen Driver For TI Minis Added by Jyacc

NEW YORK — A general-purpose screen driver for the Texas Instruments, Inc. DS990 minicomputer family has been announced by Jyacc, Inc.

SCRDRV was designed to simplify the interface between Cobol application programs and TI's Tiform data entry language, the vendor said.

SCRDRV enables the user to optionally specify automatic "screen complete" processing that moves the cursor to a verification message after all fields on the screen have been filled, the company said.

In the course of processing, the screen drive traps most errors, such as back-tab, and processes them in a logical manner, the company claimed.

SCRDRV is priced at \$1,200 from Jyacc, Inc., Suite 607, 310 Madison Ave., New York, N.Y. 10017.

### Media Enhances Series 800, 820

SANTA ANA, Calif. — Media Systems Technology, Inc. has enhanced its Series 800 and 820 automatic diskette processors to allow the creation and modification of diskette formats that can then be used to process new formats.

Format Manager now permits modification of encoding mode, sector sizes and count, identification fields and gap/sync fields, the vendor said.

Available immediately, the Model 601 Format Manager is priced at \$5,000 from Media Systems Technology, 1616 S. Lyon St., Santa Ana, Calif. 92705.

minal by allowing the transfer of entire files rather than single characters.

BMTS was designed to operate in conjunction with TI's general purpose poller, an application software package that works sequentially through a list of terminal telephone numbers.

Using the poller and BMTS, users can collect data throughout the day and transfer the collected data to a host TI DS990 computer at

night over standard telephone lines.

The price for a BMTS software license is \$1,300. The poller software license is priced at \$2,500. Both packages are provided on a double-sided, double-density diskette and will be available for shipment in September, the vendor said.

More information is available from TI through P.O. Box 202146, Dallas, Texas 75220.

## DS990 Tied to Graphics

CINCINNATI — Computer Technology Corp. (CTC) introduced a Device Service Routine (DSR) software product that reportedly interfaces the Texas Instruments, Inc. DS990 computer, using the DX10 operating system, with the Intelligent Systems Corp. (ISC) 8001 color graphics terminal.

DSR allows the capabilities of the ISC color graphics terminal to be utilized by current DX10 software without modification, the vendor said.

The basic \$500 cost of the DSR package includes object code and installation/interfacing documentation. The price may vary depending upon the purchase media selected, CTC said from Park 50 Technecenter, 2002 Ford Circle, Milford, Ohio 45150.

# Now DECwriter IVs

Now DECwriter IVs are more versatile than ever. And can be used in a much wider variety of applications. Because Digital has just introduced some important new options and models that make the DECwriter IV perfect for any major 30-45 cps application you can name.

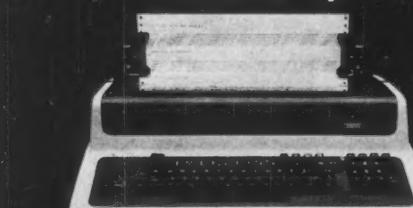
For starters, you can now add a new Extended Logic (XL) option to our Model AA with a 30-character autoanswerback for secure, unattended operation. You also get APL compatibility. Line drawing graphics. Eight international character sets. 22 baud rates from 50 baud, all the way up to 9600 baud for 25% greater throughput in typical applications. Plus a nonvolatile memory that recalls margins, tabs and other setup parameters automatically.

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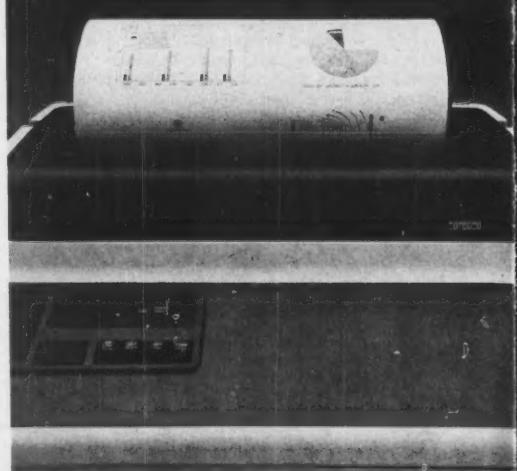
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## For Insci/80, HRS 3000 Job Evaluation Tool Now on T/S

MONTVALE, N.J. — Information Science, Inc.'s (Insci) Job Evaluation Module, a human resources management tool, is now available on its Insci/80 time-sharing service and its Human Resource System (HRS) 3000 package, which runs on the Hewlett-Packard Co. HP 3000.

The Job Evaluation Module was formerly available only with Insci's HRS II batch sys-

tem that runs on IBM mainframes.

The new module enables smaller companies to manage their human resources as efficiently as large corporations with automated personnel systems, Insci claimed. It can be used for budgeting and forecasting, as well as job evaluation, and reportedly enables employers to prove they are paying

equal wages for equal work.

Cost of the Job Evaluation Module for Insci/80 service clients is five cents per active employee per month, plus a one-time installation fee of \$750. There will be no additional charge for this module for new HRS 3000 clients, the vendor said.

The vendor is located at 95 Chestnut Ridge Road, Montvale, N.J. 07645.

PITTSBURGH, Pa. — Management Directions, Inc. (MDI) announced the general release of Direct, a financial accounting package that reportedly operates on a turnkey basis on Prime Computer, Inc.'s entire line of equipment.

Direct includes on-line accounts payable, accounts receivable, general ledger and payroll modules written in

Ansi-74 Cobol that have been developed in and optimized for the Prime operating environment, the vendor said.

Inventory and order entry modules will be available by the third quarter of this year and a fixed assets module will be added in the fourth quarter, MDI said.

Direct reportedly provides accounting controls, product standardization and documentation and mainframe processing capability.

The package, including accounts payable, accounts receivable, general ledger and payroll, is priced at \$35,000. Modules also may be individually purchased, the vendor said from 57 Longueve Drive, Pittsburgh, Pa. 15228.

## Lawson Offers Burroughs Users Order System

MINNEAPOLIS — A Purchase Order system for Burroughs Corp. system users written in structured Cobol and DMS II has been announced by Lawson Associates.

The system can be used with the company's accounts payable modules or can be installed as a stand-alone system with minor modifications, the vendor said.

The system allows the entry, printing and tracking of purchase orders, the posting of receipts against open purchase orders and the processing and controlling of payments against them.

The package contains 16 programs, including Inventory File Maintenance that allows entry, changes and deletion of inventory items and a Vendor Invoice Processing program that clears vendor invoices for payment, the company said.

The Purchase Order system is priced from \$7,000 to \$8,000 from Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

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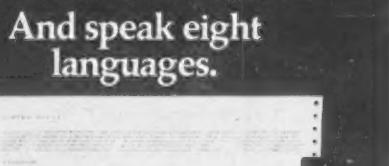
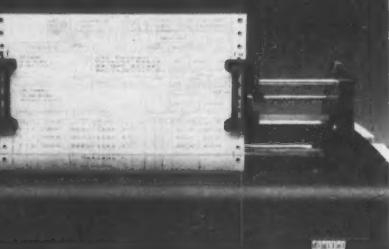
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## To Run Pascal-1 Compiler

# 'Real-Time Data Manager' Updated

PORTLAND, Ore. — Interactive Technology, Inc. announced an enhanced version of its Real-Time Data Manager (RDM) that reportedly takes advantage of the Oregon Software Pascal-1 Version 2.1 compiler.

Version 2.1 of RDM operates on Digital Equipment Corp. PDP-11 computers running under the RT-11, RSX-11M or RSTS/E operating systems and is compatible with S&H Computer Systems, Inc.'s TSX-Plus operating system, the vendor said.

RDM 2.1 includes Mini-RDM, a menu-driven subset that the vendor said is directed toward the nonprogrammer.

The full RDM data manager includes the facilities of Mini-RDM with application development tools, including the Oregon Software Pascal-1 compiler and more than 150 preprogrammed Pascal procedures, the vendor said.

The programs written in RDM reportedly can be transported to any of the supported operating systems with only a recompilation on the new system.

The RDM files are accessed by "keyname" in either a random or sequential fashion, the vendor said, and the supported data types include all of the Pascal-1 data types and spe-

cific data types to facilitate the manipulation of dollars, dates and bytes.

RDM Version 2.1 is priced at \$9,000 for the RT-11 version and \$12,000 for the RSX-11M and RSTS/E versions. Mini-RDM is priced at \$2,800 for all three systems.

The vendor is located at 1225 N.W. Murray Road, Portland, Ore. 97229.

## Law Office, CPA Client Packages Work in Dibol for DEC Systems

SOUTH PASADENA, Calif. — Law-11, a law office management system, and CPA-11, a client accounting system for certified public accountants and professional accountants, are being offered by Franklin Computer Systems, Inc.

Law-11 gathers and reports profes-

sional charges and provides complete billing, accounts receivable, general ledger and calendar functions, the firm said.

Law-11 also includes management information such as productivity, case load and work-in-process reports, according to the vendor.

Written in Dibol, Digital Equipment Corp.'s commercial programming language, it runs on DEC Data-system 300 and 500 series computer systems with a minimum of 128K bytes of main memory, the vendor said.

### Expanded Version

CPA-11 Release 2 expands upon the firm's earlier version. CPA-11 is written in Dibol and also runs on DEC Data-system 300 and 500 series computers with a minimum of 64K bytes main memory. Both floppy and hard-disk systems are supported, and systems may be configured with from one to 32 CRT terminals, according to the vendor.

CPA-11 permits the user to tailor the content and format of financial reports through the use of parameter codes, the vendor said.

CPA-11 costs \$5,000 and Law-11 costs \$15,000, both including training from the firm at 715 Fremont Ave., South Pasadena, Calif. 91030.

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## Forms Tool For Data Entry Runs on VAX

TULSA, Okla. — Viking Software Services, Inc. has developed the Viking Forms Manager (VFM), a data entry software package for Digital Equipment Corp. VAX-II processors.

VFM interactively creates, operates and maintains the data entry part of programs, the vendor said. It includes the VFM Forms Development Facility, which reportedly creates and modifies screen formats separately from the program logic.

The forms are linked with the application program and documentation is automatically generated, the vendor said.

The VFM Execution and Time Subroutine Library is said to enable the programmer to address the data on a terminal screen as a single logical record.

The VFM Exerciser is designed to test the human engineering and validation features to ensure the forms are logically correct, efficient and aesthetically pleasing.

Also included is the VFM Data Entry System, described as a key-to-disk program that creates customized data entry programs by linking the user-defined forms definitions with the program.

The VFM package can be purchased for \$8,000 and quantity discounts are available, the vendor said from Suite 816, 2815 E. Skelly Drive, Tulsa, Okla. 74105.

## Data Digitized For VAX-11s

FULLERTON, Calif. — Design Aids, Inc. here completed the conversion of DS1, its nongridded electronic schematic data capture program, to Digital Equipment Corp.'s VAX-11/780 computer, as well as the DS1-SCI-Cards interface for Scientific Calculations, Inc. (SCI) equipment users.

DS1 allows the computer operator to digitize directly from a free-hand electronic sketch to computer. A typical "D" size drawing reportedly takes an hour maximum to digitize. The computer automatically straightens the crooked lines, inputs the correct size symbols and enters imposed alignments among the symbols for aesthetic purposes.

A connection net list and bill of materials are automatically extracted from the data base of the digitized schematic, the vendor said.

The operator can make changes by writing them on the drawing, performing the edit and outputting the final drawing.

In addition to DEC equipment, DS1 operates on Data General Corp.'s Nova 4X and Eclipse, Sperry Univac, IBM and Harris Corp. computers. It currently is interfacing to the DEC PDP-11/34 RSX11 operating system.

DS1 is priced from \$42,000 to \$79,000, depending on the options selected, the vendor said from 1661 E. Chapman Ave., Fullerton, Calif. 92631.

# Executive 80<sup>TM</sup> cuts life cycle costs.

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Now that Spain's trade policies have become more liberal, the country has become a major market for U.S. exports. The tremendous demand for these exports is reflected in a broad range of product categories—and one of the largest is data processing equipment.

There are currently 4,000 general purpose computers at 3,000 sites in Spain at a total installed value of more than \$2.2 billion. In addition to general purpose computers, there are 11,000 office computers. And Spanish DP industry revenues are increasing 20% to 30% a year.

To meet this growing demand for DP equipment, products and services—computer professionals read *Computerworld/Espana* when they look to buy. *Computerworld/Espana* is the only EDP newspaper serving the Spanish data processing market. Modeled after its sister publication *Computerworld*, it is a weekly tabloid with the most up-to-the-minute information for DP professionals and users who need to keep informed on the fastest growing industry in the area.

With a large editorial staff based in both Barcelona and Madrid, *Computerworld/Espana* covers the latest developments in the computer industry including products and services, application stories and new companies entering the market. And *Computerworld/Espana* has more than 6,000 readers who would like to hear from you.

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## Resource Monitor Updated For Microdata Reality Units

CINCINNATI — Burns & Associates released Version 4 of its System Resource Monitor (SRM) for the Microdata Corp. Reality series.

SRM reportedly provides the system user with a real-time display of disk and CPU usage for all tasks active on the system.

It is said to provide the system user with the information necessary to isolate system performance problems and to assess the need for, and effect

of, configuration changes.

SRM Version 4 operates with Microdata Reality systems having 3.x level firmware and Versions 3 or 4 of the Reality operating system.

The SRM package is licensed for a one-time fee of \$250 for a single computer system, the firm said. Multiple system discounts and an annual update service are available from the vendor through P.O. Box 451, Cincinnati, Ohio 45201.

## Version 2.0 of 'Docu-Mint' Adds Procedure, Menu Explosions

HINSDALE, Ill. — Version 2.0 of Docu-Mint from Business Computer Design, Inc. features stand-alone, menu-driven software documentation for IBM System/34 computers. It also costs \$345 less than its predecessor.

The previous version contained six modules allowing the user to generate system program flowcharts, file record layouts and several different cross-references. Version 2.0 generates 12 separate detailed reports not found in the earlier version, accord-

ing to the vendor.

Docu-Mint now includes procedure and menu explosion utilities, which fully list and "explode" system flow of procedure runs up to 16 levels. Another feature is the File/Field/Program cross-reference, a listing of all fields that access a file and in which programs those fields can be found, the vendor said.

The package has been reduced in price from \$895 to \$550, BCD said from 15 Spinning Wheel Road, Hinsdale, Ill. 60521.

## Flight Schedules Go On-Line

VAN NUYS, Calif. — On-line access on a time-sharing basis to Worldwide Flight Schedules (WFS), a data base containing monthly data on schedules of approximately 250,000 flights by 500 airlines at 6,000 airports, is being offered by Proprietary Computer Systems, Inc. (PCS).

The WFS data base reportedly contains monthly data on approximately 250,000 scheduled passenger and cargo flights, both domestic and inter-

national, throughout the world.

The WFS data base also contains geographical information about each airport, including the airlines providing service there and the minimum connect time of each airline.

The data base is available to all subscribers of PCS' time-sharing system. There is no initiation fee for use of WFS and charges are based on the amount of computer resources actually used, the vendor said from 16625 Saticoy St., Van Nuys, Calif. 91406.

## Tymshare Backs Electric Utilities

CUPERTINO, Calif. — Tymshare, Inc. is now offering a load analysis and reporting system for electric utilities through a marketing agreement with Intel Systems Group of Austin, Texas, developers of the system.

The Load Analysis and Market Planning (LAMP) system was designed to satisfy reporting requirements imposed on electric utilities by federal government and state public service commissions.

LAMP is a specialized data base management system that allows both load data and market demographic data to be combined into a common data base. Various application pro-

grams are integrated with proprietary software provided by Intel. LAMP provides seven standard reports, all of which can be modified to meet individual utility requirements. Reports can be produced for any group of utility customers with any time span or time interval desired. Additional reports can be created easily to meet specific regulatory analysis needs, the firm said.

A typical installation runs \$6,000 to \$10,000/mo, depending on the number of meters installed and system utilization. Tymshare is located at 20705 Valley Green Drive, Cupertino, Calif. 95014.

## Hastech Releases Tops/4 Updates

MANCHESTER, N.H. — Hastech, Inc. has released Versions 5.0 and 6.0 of its Tops/4 software enhancement product for use with its HS40 text processing systems.

Version 5.0 provides expanded classified capabilities, including rate and discount enhancements, classified backup in a dual-system configuration and an Adtaker prompting system, the vendor said.

It also offers increased composition functions such as expanded typesetter font storage, system format ex-

pansion and several new commands, according to the vendor.

Version 6.0 is said to expand Tops/4 classified advertising capability to include credit checking, Julian calendar tracking and routine sorting. Its enhanced composition functions include typographic kerning, ligature recognition and automatic white space reduction and addition.

Versions 5.0 and 6.0 of Tops/4 are available for \$3,000 each from Hastech at 670 N. Commercial St., Manchester, N.H. 03103.

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## CIS Cobol Extended

SANTA CLARA, Calif. — Micro Focus, Inc. announced an implementation of CIS Cobol for Bell Laboratories' Unix time-sharing system that reportedly allows ANSI-74 standard Cobol programs to be compiled and executed on Digital Equipment Corp. PDP-11 and LSI-11/23-based Unix systems.

The vendor said the software also can be made available on any other processor equipped with a Unix operating system and C compiler.

Unix CIS Cobol is said to be compatible with other Unix languages, utilities and files.

Data files may be sorted, edited and processed by other Unix subsystems, the vendor said, adding that the full capability of Unix software development tools can be utilized by the CIS Cobol programmer.

Unix CIS Cobol ranges in price from \$1,000 to \$2,000, the vendor said from 1601 Civic Center Drive, Santa Clara, Calif. 95050.

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Multi-level hierarchical files	Yes
Call FORTRAN and COBOL, PL/1 subroutines	Yes
Multi-dimensional arrays	Yes
Handles multiple level related files	Yes
Allows external subroutines	Yes
Schema and subschema definitions	Yes
File tree-names	Yes
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User defined variables	4096
Variable name lengths	32 char.
Concatenated data variables	Yes
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Easy to use programming language	Yes
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Price	\$9,600

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## 'Warranty Claims System' Expedites Payments

ENGLEWOOD CLIFFS, N.J. — A Warranty Claims System designed for the electronics and appliance industries and said to expedite the entry, verification and payment of claims on products under warranty has been announced by Datamatics Management Services, Inc.

The system is available to users of Datapoint Corp. hardware and can provide information concerning the number of days from purchase to failure on each item for which a claim was submitted while verifying claim information before payment is made, the vendor said.

The Warranty Claims System is priced at \$15,000 exclusive of installation and training and is available from Datamatics Management Services, Inc., 140 Rt. 9-W, Englewood Cliffs, N.J. 07632.

## Consultation Service Backs Users of DEC's RSTS/E

PORLTAND, Ore. — Nortek, Inc. here announced the availability of a consultation service for RSTS/E users on Digital Equipment Corp.'s PDP-11/23 computer.

The service consists of modifying customer-supplied hardware specific routines for compatibility with the

11/23's architecture. RSTS/E is DEC's multiuser, multitasking, time-sharing operating system for Unibus members of the PDP-11 family.

It supports the variety of programming languages and application software available for the PDP-11 family. DEC has not yet announced licensing plans for the 11/23. Through a series of runtime systems, RSTS/E substantially emulates the RT-11 and RSX-11M operating systems. This capability will assist LSI-11 users who have investments in RT-11-based software, but want to exploit the additional capabilities their 11/23 provide.

The RSTS/E evaluation assistance service is priced at \$500, Nortek said from 2432 N.W. Johnson St., Portland, Ore. 97210.

## Westlaw Data On J100, J500

SANTA MONICA, Calif. — An automated case law data retrieval system is available to lawyers nationwide from AM Jacquard Systems.

Accessible through the firm's J100 and J500 small business computers, the Westlaw data base includes the text of cases reported in the "Supreme Court Reporter" from 1932 and cases in the "Federal Reporter" and "Federal Supplement" from 1961.

Westlaw also includes the full text of appellate court cases for all states from at least 1978 and the full text from most states from at least 1967. By the end of 1981, the full text of appellate cases for all states from 1967 will be entered into the data base, according to the firm.

J100 and J500 users must install a 1,200 bit/sec, Bell 212A-compatible modem and an interface software package. The package costs \$800 plus installation.

The firm is located at 1900 Ave. of the Stars, Los Angeles, Calif. 90067.

## Screen Control/Analysis Simplifies DG Functions

OKLAHOMA CITY, Okla. — A screen control/analysis program has been developed by Computer System Consultants, Inc., which reportedly simplifies the control functions on Data General Corp. 6053/D200 terminals.

These facilities provide users with the ability to develop screen forms using the Screen Control program, to obtain an analysis of control function positions and to use and manipulate these forms with the provided Fortran subroutines, according to the vendor.

The Screen Control program used to develop the forms is controlled by the CRT function keys. With the available menu, the user may select any of the CRT func-

tions such as reverse video, blinking, underscore and dim, according to the vendor.

There are more than 30 Fortran subroutines to support the various 6053/D200 functions as documented in the DG D100/D22 reference manual, No. 014-000640. Currently available only in Fortran, the program will soon be available in other DG languages.

Screen Control/Analysis costs \$350 and includes documentation menus for DG 6053/D200s and necessary subroutine libraries. The documentation alone can be obtained for \$10. The vendor is located at Suite 20, 420 N.W. 13th Street, Oklahoma City, Okla. 73103.

## Imlac Series II Terminal Supported by 'CI-3000'

NEEDHAM, Mass. — The Imlac Corp. Series II interactive vector refresh terminal is reportedly now fully supported by the DI-3000 machine-independent host graphics software system supplied by Precision Visuals, Inc.

The DI-3000 package features user-callable subroutines for development of graphics application programs and was designed to adhere to the functional

specifications of the 1979 ACH/Siggraph graphics standards, the company said.

The device driver written for the terminal uses the full addressability and built-in firmware for dynamic interaction, the vendor claimed.

The Imlac Series II terminal is priced at \$15,750 and further information on the terminal and the DI-3000 package is available from Imlac Corp., 150 A St., Needham, Mass. 02194.

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# COMMUNICATIONS

## Teletype 4430: Poll>Select Unit

**SKOKIE, Ill.** — Teletype Corp. has announced a poll/select CRT terminal for asynchronous multipoint private-line systems.

The Model 4430 terminal features several of the Ansi 3.28 protocols and supports the same asynchronous multipoint operations upheld by Teletype's Model 40/3 CRT terminal and the AT&T affiliate's models 33, 35 and 43 teleprinters.

Top speed for the 4430 is 4,800 bit/sec, Teletype said, and up to five on-line buffers are available to boost throughput. The CRT terminal has a printer port and a send/receive port that optionally accommodates another CRT terminal, teleprinter or compatible storage device.

Other features include speed selection; replies to polling and addressing, simultaneous local and line operation, message control character generation, various formatting and editing capabilities, diagnostics and a tiltable display, the firm's spokesman said.

Deliveries are slated to begin late this year. The Model 4430 costs \$4,963, Tele-

te noted from 5555 Touhy Ave., Skokie, Ill. 60077.

## Interface Board Aids DS990 Links

**AUSTIN, Texas** — A microprocessor-based communications interface board that enhances the distributed network performance of Texas Instruments, Inc.'s DS990 minicomputer systems is available from TI.

The Bit Character Interface Module provides a communications interface with added flexibility for handling protocols, speeds and configurations, according to TI.

The product supports bit-oriented protocols such as Synchronous Data Link Control and High-Level Data Link Control, as well as the character-oriented protocols, Binary Synchronous Communication and Teletype Corp.'s Teleprinter, the vendor's spokesman said.

The board costs \$900. TI can be reached through P.O. Box 202146, Dallas, Texas 75220.

## Net Links Nine Hospitals, Speeds Revenue Recovery

By Bruce Hoard

CW Staff

**BEECH GROVE, Ind.** — Reduced response time and increased revenues are the hallmarks of a nine-hospital network run by The Sisters of St. Francis Health Services, Inc. since it settled into its new, three-floor computer center here. The system serves a total of approximately 3,400 patient beds.

After 10 years in its previous facility — a former laundry — the service could no longer accommodate the flood of 17,000 transaction requests placed every hour by the hospitals, which cover a geographical area that spreads from Cleveland to Memphis, Tenn., to Chicago Heights, Ill.

The network, which includes 700 terminals that are on-line 24 hours a day, has seen its end-user response time drop from five seconds to about three seconds. Contributing to the change is a CPU configuration of an IBM 370/168 and another 370/158; previously, the network was based on two 158s.

### Lost Charges Found

Although it is difficult to accurately monitor cash savings, there has been a 10% revenue increase in at least one department since the move, according to Jim Norman, director of information services for the Sisters of St. Francis.

"All you're doing is finding a lost charge out there," he said of the revenue increase. "Where somebody didn't report the charge previously, we now catch this charge because we automated the department."

The mainframes are running under CICS

**With 2,560-, 3,440-Char. Screens**

## Harris Terminals, Printer Out

**DALLAS** — Harris Corp. has unveiled two CRT terminals, one with a screen capacity of 2,560 and the other with 3,440 characters. The firm has also released a dot matrix printer that provides a field-upgrade path as print requirements increase.

The CRT terminals, models 9278-11 and 9278-12, support earlier models and automatically adjust from a 1,920-char. screen to the larger sizes, Harris said. The CRTs use the full display area in all applications

and MVS. Pansophic Systems, Inc.'s Easytrieve and Cullinane Database Systems, Inc.'s IDMS data base management system provide data base services.

Storagewise, the system employs Memorex Corp. disk drives to maintain approximately 8G bytes of memory.

### RJE Setup

Twenty-four dedicated, voice-grade 9,600 bit/sec lines tie the system together and provide conduits for the remote job entry (RJE) stations that act as the primary remote computing links. Several different RJE devices are in use, including IBM 8100s and System/34s. They are also used for data entry, Norman said. The hospitals, depending on their size, have between two and four lines running to them.

Each location backs up its RJE with an average of 100 CRT terminals and 30 printers. Many of the CRT terminals are IBM 3278s.

The cost for each hospital to participate in the network is about \$6 per patient day, according to Norman, who said accounts payable and general ledger are two of the most commonly used applications.

Despite their dependence on the central computing center here, the hospitals have retained a measure of computing integrity. Several have retained their minicomputers for certain in-house applications, and "they can do their own Cobol through the RJE," the director of information services noted.

The central site does some batch bill updating at night, but the hospitals are free to run their applications 24 hours daily whenever they choose, he added.

regardless of whether the screen capacity is 1,920 or 3,440 characters.

The 9278-11 costs \$2,624 and the 9278-12 costs \$2,706.

The Model 9287 dot matrix printer offers a range of print rates and can reportedly be field-upgraded from 80 char./sec to 130 or 180 char./sec. It costs \$4,902, Harris said.

It costs \$4,902, Harris said from 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240.

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- Racal-Vadic Modems & Couplers
- DEC LA-34, LA-120, VT-100, LA-36

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- Meanwhile, up in Vermont, Computerworld looks on as IBM's fantastic, futuristic factory turns out millions of micro chips.

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Boston	WXNE	25	Wednesday	10:30 PM
Washington, DC	WDCA	20	Saturday	12:00 Mid.
Philadelphia	WTAF	29	Monday	10:30 PM
Dallas/Ft. Worth	KNBN	33	Tuesday	5:30 PM
Detroit	WXON	20	Saturday	10:00 AM
Minneapolis / St. Paul	KMSP	9	Saturday	TBA*
Houston	KHTV	39	Monday	12:00 Mid.
St. Louis	KDNL	30	Sunday	5:30 PM
Atlanta	WANX	46	Tuesday	11:00 PM

\*Check local listings for time.

## Personal Computer Modem Eliminates DAA Charge

MENLO PARK, Calif. — A modem designed for compatibility with several personal computers, including machines from Apple Computer, Inc., Radio Shack, Commodore Business Machines, Inc. and Atari, Inc., is available from Bizcomp Corp.

The Model 1084 Intelligent Versa-modem is compatible with the Bell-standard 103 protocol and is Federal Communications Commission-registered for direct connection, eliminating the monthly rental charge for a phone company DAA attachment device.

Applications include store-and-forward message routing, remote database access, off-hours automatic poll-

ing, computer/terminal networking, remote computer diagnostics and CPT-TWX network nodes.

The preset 300 bit/sec data rate may be user-optioned down to 200-, 150-, 134.5- or 110 bit/sec.

The modem costs \$299 from Bizcomp at P.O. Box 7498, Menlo Park, Calif. 94025.

## Digitizer Runs Voice and Data

MIAMI — Racal-Milgo, Inc. is offering a voice digitizer that transmits voice and data communications in digital form at 2,400 bit/sec.

Phoneplex-24, when used in conjunction with multiport modems, will allow up to four simultaneous voice conversations or any combination of voice (analog) and data (digital) communications to share a common facility link.

Designed to provide cost efficiencies in domestic long-haul and multi-national circuits, it addresses point-to-point and PBX tandem switching applications.

The voice digitizer costs \$9,000 from Racal-Milgo at 8600 N.W. 41st St., Miami, Fla. 33166.

## Loop-Back Unit Tests Data Links

NEW YORK — Com/Tech Systems, Inc. has unveiled an on-line digital loop-back link to test continuous carrier data links from the office site.

The Link/Chek Model 202C slave unit is compatible with Link/Chek units that provide bit error rate and interface checks from a central site.

The tester extends the capability of the Link/Chek system to full-duplex links as well as half-duplex and multidrop links. It costs \$575, Com/Tech said from 505 Eighth Ave., New York, N.Y. 10018.

## X.12 Committee Sets New York Meet

NEW YORK — A meeting of the X.12 Committee will be held at the General Electric Co. Auditorium, 570 Lexington Ave. here June 25.

Tom Jones, chairman of the Liaison Task Group for the International Standards Organization (ISO), will give a report from the special task group on liaison with the ISO reference model for Open Systems Interconnection.

The meeting is open to the public.

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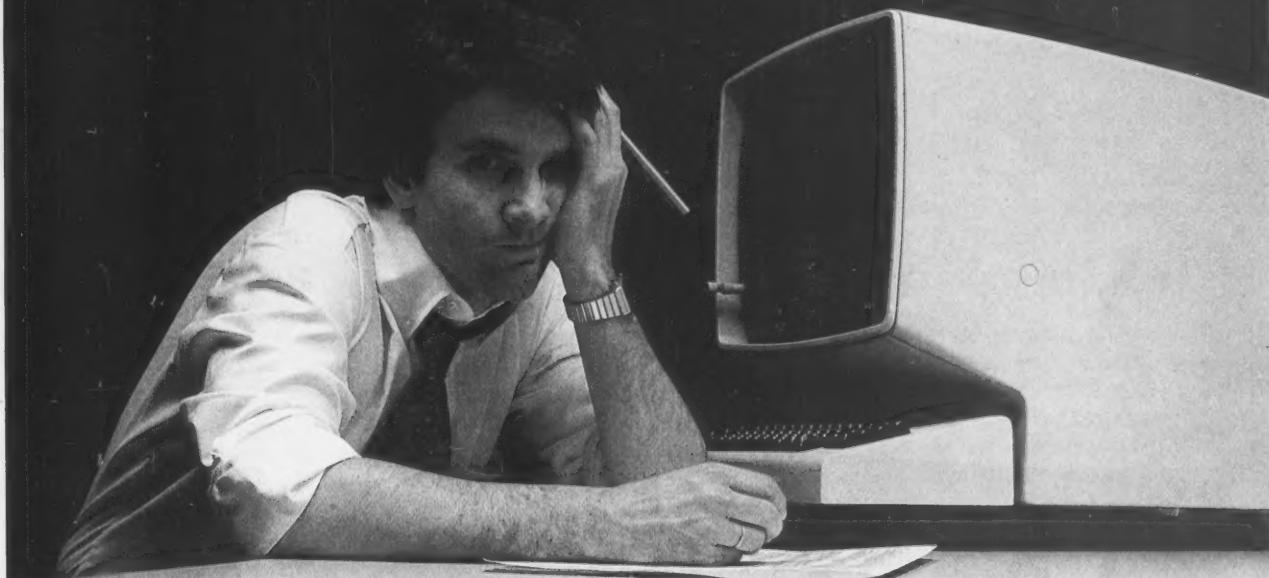
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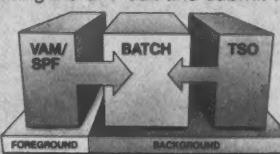
### An alternative to costly hardware upgrades

By getting more out of your current equipment, VAM/SPF can actually improve your bottom-line operations. Because up to 35 SPF users fit into a single VAM

address space, you'll have a lot more TSO resources ready to respond without usurping the rest of the system. All your batch and on-line jobs can run faster.

### VAM/SPF is the architectural solution

Boole & Babbage has taken IBM's architecture and turned it into the ideal timesharing system with the classic foreground/background approach. By forcing the SPF edit-and-submit work to



be done under VAM as a classic foreground activity, VAM provides SPF users with truly interactive response time. Background activities such as on-line testing remain under TSO.

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## Sharing Unit Functions As Four-Terminal Modem

DOYLESTOWN, Pa. — A data channel sharing unit that functions as a modem for up to four terminals or provides port sharing for up to four modems simultaneously, is available from Develcon Electronics, Inc.

The Model DS848 reportedly supports any mixture of terminals, ports and/or modems on its contending shared channels, according to Develcon.

### Speeds to 19.2K Bit/Sec

Operating synchronously or asynchronously at speeds up to 19.2K bit/sec, it transmits data on a first come, first served basis in its shared channel mode, according to the vendor.

The data channel sharing unit costs \$1,060, Develcon said, from 200 N. St., Doylestown, Pa. 18901.

## CRT Boasts Infrared Beam

EL SEGUNDO, Calif. — A touch-sensitive CRT terminal featuring scanning infrared beam technology is available from Ampex Corp.

The terminal requires no typing skills and offers detached keyboard, brightness control, descenders on lowercase letters and nonglare keytops.

The product has an RS-232C asynchronous interface and operates at speeds up to 19.2K bit/sec, half or full duplex.

The 128 displayable symbols include 96 Ascii characters, 21 control characters and 11 characters to support line drawings.

It costs \$2,498 from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

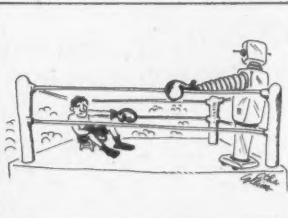
## Package Links Eptak, Intelligent Devices

DAVENPORT, Iowa — Eagle Signal Industrial Systems has announced a communications package said to provide an inexpensive way to transmit data between the company's Eptak systems and other intelligent devices over long distances.

The CP7COM provides distributed control between multiple Eptak systems, between systems and computers or between systems and any other device that has an RS-232C or current loop interface, the vendor claimed.

Full-duplex communication is possible with a speed up to 9,600 bit/sec at distances up to 10,000 ft.

The CP7COM communications package is priced at \$120 from Eagle Signal Industrial Systems, 736 Federal St., Davenport, Iowa 52803.



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# IBM Studies Documentation Manuals: Graphics Worth 1,000 Words

By Tom Henkel  
CW Staff

The old line about a picture being worth a thousand words may find new life in one of the less exciting elements of computing — documentation. Users can apparently deal with pictures of hardware much better than they can follow volumes of text explaining a piece of hardware.

In fact, a recent study by IBM could revolutionize the way hardware manuals are presented. The study concluded that integrated graphics representations of the hardware (or detailed drawings), along with

the standard documentation, can improve problem-solving efforts by as much as 19.3%.

Reported in the latest edition of the *IBM Systems Journal*, the experiment focused on IBM customer engineers (CE) doing field maintenance. However, the report noted that the integrated graphics concept could be used in all types of hardware manuals.

## Two Areas

Conducted by J.M. Judisch of IBM's Information Systems Division in Rochester, Minn., B.A. Rupp, who is with the General Products Division in San Jose

and R.A. Dassinger of IBM's Raleigh, N.C., Field Engineering Division, the study analyzed two areas:

- First, the researchers wanted to find out whether putting hardware manuals on microfiche, a move that would make hardware manuals less expensive and easier to distribute, would be accepted by users.

- Secondly, the researchers wanted to know if the Graphic Integrated Manual (GIM) approach would make the user's job easier.

The study found that the GIM approach is better in both a hard-copy and microfiche for-

mat. However, participants in the study said they strongly disliked microfiche manuals and, the report noted, volunteers in the experiment solved problems 5.2% slower using microfiche.

Calling the microfiche process similar to learning to drive a right-hand-drive car after already knowing how to drive a left-hand-drive model, the researchers assembled a group of 32 CE trainees. The volunteers were divided into two 16-member subgroups that were trained on different types of manuals.

Group 1 was trained using traditional manuals. Group 2 was trained using the GIMs for IBM's 5424 multifunction card unit, an electromechanical device used with the firm's System/3 Model 10 processor. However, Group 2 used traditional manuals for the System/3 Model 10.

To test both the microfiche concept and the GIMs, each student was given a set of 24 problems to solve that were divided into four groups: the traditional hard-copy manuals, the traditional manual on microfiche, the GIM in hard-copy form and the GIM in microfiche form.

Field upgrade kits are also available. They cost between \$5,000 and \$5,800, and monthly maintenance fees range from \$4 to \$27, the vendor said from 200 Smith St., Waltham, Mass. 02154.

(Continued on Page 48)

## Five Field-Upgradable Models

# Storage Fits Honeywell Systems

WALTHAM, Mass. — Honeywell, Inc. has announced five field-upgradable models of a mass storage subsystem for its financial and banking systems.

The 8-in. drives that make up the CSD7000 line consist of Winchester-type fixed rigid disks as well as removable disks. The units can be configured alone or in a combination, offering formatted storage capacities ranging from 630K- to 8.7M bytes, the vendor said.

The self-contained tabletop units provide random-access storage in a dedicated environment, and the drives are fully compatible with Honeywell's Series 7400 in-lobby and back-office intelligent transaction controller terminals for cash control, data capture and printing applications.

Honeywell said the drives are scheduled to be available on the entire Series 7000 line of financial transaction system products.

## Two Models

There are two Winchester-type models with storage of either 4.2M- or 8.4M bytes. Both units have a recording density of 6,327 bit/in., and either model can be configured with one single-sided floppy diskette for storing an additional 315K bytes at a recording density of 3,408 bit/in. Two single-sided floppy disks can be configured without a Winchester-type disk to provide 630K bytes of formatted storage capacity, the vendor said.

Diskettes are read/write compatible within the CDS7000 family and with Honeywell's existing Model 7430 dual diskette drive. CDS7000 models have either one or two rotating magnetic storage units. They all have operator and diagnostic panels, an intelligent controller, power supply and associated cables. The units link to other Honeywell financial industry equipment through a single-board buffered adaptor

resident in one of the input/output controller positions in the intelligent transaction controller, the vendor said.

Features include a self-test capacity and interlock circuitry to prevent damage when loading or unloading devices, the vendor said.

A 4M-byte fixed rigid disk subsystem (Model CDU7001) costs \$8,000 with a \$51 monthly maintenance fee.

CDU7002, an 8.4M-byte fixed rigid disk subsystem, costs \$8,800 with a \$55 monthly maintenance fee. A 4.2M-byte fixed rigid disk subsystem with

a single 315K-byte diskette (Model CDS7010) costs \$9,000 with a \$55 monthly maintenance fee. An 8.4M-byte fixed disk unit (CDS7011) with 315K bytes of diskette storage costs \$9,800 with a \$59 monthly maintenance fee. A 630K-byte diskette unit (DDU7002) costs \$5,000 with a \$32 monthly maintenance fee.

Field upgrade kits are also available. They cost between \$5,000 and \$5,800, and monthly maintenance fees range from \$4 to \$27, the vendor said from 200 Smith St., Waltham, Mass. 02154.

# Plot Management System Debuts

HARTFORD, Conn. — Gerber Scientific Instrument Co. has announced a plot management system, the PMS 7000, for users of distributed plotters.

A disk-based system, the PMS 7000 enables users to manage up to eight Gerber pen plotters or photoplotters in a distributed plotting network. The plotters can either be linked to a host processor or used as a stand-alone system, the vendor said.

Features include plot queuing, data conversion, job accounting and data transmission, the vendor said.

Design verification drawing can be produced by high-speed Gerber plotters while finished drawings can be produced by Gerber precision plotters in a remote drafting area. The PMS 7000 can collect data from a variety of devices in different formats. The unit also has a plot queuing feature that enables the operator to

assign priorities for up to 32 plotting jobs. The unit automatically transmits plotted data specified on the plot queue to the next appropriate plotter, the vendor said.

A basic PMS 7000 configuration includes the firm's Model 7000, two video display stations with a shared ASCII keyboard, 256K bytes of main memory, a 16M-byte disk, a dual-density magnetic tape unit and one

plotter interface, the vendor said.

Options include a remote job entry communications package for IBM 360 and 370 processors, a distributed systems communications package (with another PMS 7000) and a 120M-byte disk drive.

Systems start at \$75,000. The vendor can be reached at P.O. Box 305, Hartford, Conn. 06101.



Gerber Scientific's PMS 7000

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## Turnkey Graphics System Uses Data Base Techniques

LITTLETON, Colo. — Interactive Systems Corp. has announced a turnkey interactive graphics mapping system that uses a hierarchically structured data base technique to reportedly accommodate very large data files.

The Interactive Mapping System can define the interiors of boundaries and handle dynamics such as weather and vehicle movement. The system supports simultaneous usage by multiple users and features access rates that are independent of the size of the data base.

A display management package provides the capability for interactive input, modification, querying and display of multiple map files.

The system uses the Digital Equipment Corp. VAX-11/780 as a host processor. It can be interfaced to a

Megatek Corp. or several other graphics display systems.

The package may be purchased as a turnkey system including a host processor, all software, peripherals and graphics displays.

### Stand-Alone Package

However, current VAX owners may purchase the GBT Record Access Manager as a stand-alone package.

Users can also purchase the complete software package if using a graphics display system, the vendor said.

Prices for the Interactive Mapping System, which is directed at the energy, utility, demographic and transportation industries, start at \$400,000. Interactive Systems Corp. is based at 550 S. Sycamore, Littleton, Colo. 80120.

## Interface Lets Computers Send to Phototypesetters

WILMINGTON, Mass. — A modular photocomposition system featuring a communications interface said to allow data transmission from a word processor or computer directly to typesetting has been announced by Compugraphic Corp.

The MCS system, including software, is designed to meet major typesetting applications of the commercial, newspaper, government and education markets and features fully automated production flow and output flexibility, the vendor said.

With the Advanced Communications Interface (ACI), transmission

takes place either on-line or by telephone with a modem, and the ACI can interface with any word processor or computer system, the vendor said.

The basic system configuration includes a keyboard and screen, a microprocessor-based controller, disk storage unit and a choice of digitized typesetters that differ in their running speed and on-line typeface capacity, the company said.

The basic system is priced at about \$30,000 and is available from Compugraphic Corp., 200 Ballardvale St., Wilmington, Mass. 01887.

## Bar Code Printer Series Debuts, Available in Three Print Formats

LYNWOOD, Wash. — A series of bar code printers for producing bar code labels and tags via an integral keyboard display, user-supplied auxiliary CRT terminal or a computer protocol has been announced by Interface Mechanisms, Inc.

The S Series is available in three print formats — bar code with interpretation line, interpretation line with one line of free text and inter-

pretation line with three lines of free text, the vendor said.

Designed for on-site, random-access bar code label preparation, the series can print on adhesive paper labels, tags or high-durability plastic label stock, the company claimed.

The S Series printers are priced starting at \$5,945 from Interface Mechanisms, Inc., P.O. Box N, Lynnwood, Wash. 98036.

## Graphics Worth 1,000 Words

(Continued from Page 47)

GIMs, both hard-copy and microfiche versions, than CEs using traditional methods.

At the conclusion of each problem, the students were asked to rate two statements. "This manual is well-written and organized and provides an excellent basis for shooting bugs (solving problems)" and "Microfiche is a better medium for presenting this material than hard copy." The students were asked to rate their level of agreement with those statements on a scale of 1 to 5, a 1 meaning "strongly agree" and a 5 meaning "strongly disagree."

On the first statement, when the CEs used the GIMs they strongly agreed with the statement (with a

mean score of 1.75). Using traditional manuals, they disagreed slightly with a mean score of 3.34.

The CEs did not agree with the second statement. Regardless of the format, the average mean score was 4.24. The CEs disagreed more strongly when they used the traditional format microfiche. The mean score was 4.33 and when they used the traditional hard copy the mean score was 4.15.

The team of IBM researchers concluded the graphics integrated approach generally allows users to solve problems faster. And none of the volunteers appeared worse at solving problems with the GIM manuals.

**MINIVAC**

ALBUQUERQUE, N.M. — A real estate firm here said Hewlett-Packard Co.'s HP 3000 rated better than IBM's 4331 in vendor-conducted benchmark tests done with the user's batch applications.

With four batch programs performing sorts and direct update runs of files using sequential access, the HP 3000 Series III, with between eight and 27 active batch sessions, performed about 21% more slowly than a dedicated 4331 Model Group 1, according to the Bellamah Group, Inc. However, in a job stream with Cobol programs that sorted a 60,000-record file, updated seven files (half direct-access and half Isam) and produced a 28,000-line report, the HP 3000 in a stand-alone batch mode performed 24% faster than the 4331.

"The main conclusions we drew from these results is the more complex the job, the better the HP 3000 performs," according to the firm's information systems manager, Steve Perrin.

Bellamah also contends the 4331 required too much main memory to support the DOS/VSE operating system

CICS and IMS. Perrin said that a 1M-byte 4331 required about 600K bytes of main memory to support the IBM program products, leaving about 400K bytes for data and programs. A 1M-byte HP 3000 Series III, on the other hand, required about 40K bytes of main mem-

## HP 3000 Bests IBM 4331 In Benchmarks

ory to support system software.

After conducting the benchmark tests, the firm developed a 150-category matrix to evaluate the two processors. Categories included hardware, software, vendor support and price. On a 100-point scale, the HP 3000 scored 79

points and the 4331 scored 68, Perrin said.

However, Bellamah chose the HP 3000 primarily because the company decided the unit's DS/3000 software was less complex and easier to use than the IBM counterpart.

"We saw much added complexity in the distributed solution for the 4331, which was designed primarily as a batch machine," Perrin said.

The HP 3000, he added, was better suited for interactive processing. "The HP 3000's Image data base management system and Query software for on-line ad-hoc inquiry would make it easy to build and access our data bases," he said.

Based on its evaluation, Bellamah installed the Series III in January 1980. The system, with 1M bytes of main memory, is configured with 600M bytes of disk storage, one tape drive and a 1,100 line/min printer. Twenty terminals are spread throughout various user divisions in Colorado, Arizona and New Mexico for on-line data entry and

(Continued on Page 50)

## TI Reduces DS990 Prices

AUSTIN, Texas — Texas Instruments, Inc. has cut prices on its DS990 processor line up to 13%. Models affected include the 7, 8, 9, 20 and 29. TI said large-volume productions of the processors allow the cuts.

A DS990 Model 7 processor with 128K bytes of main memory and 32M bytes of disk storage now costs \$34,000. A Model 8 with 128K bytes of main memory and 100M bytes of disk storage costs \$45,700.

A Model 9 with 128K bytes of main storage and 96M bytes of disk storage costs \$39,000. A Model 20 with 256K bytes of main storage and 100M bytes of disk storage costs \$69,250, and a Model 29 processor with 256K bytes of main memory and 96M bytes of disk storage costs \$63,000, TI said.

### Storage Media

The DS990 models 8 and 20 utilize two 50M-byte disk drives with fully removable media.

The models 7, 9 and 29 use dual-platter cartridge module disks with 16M bytes of removable storage and 16M or 80M bytes of fixed data storage, the firm said.

Decreases in the cost of disk storage were a major factor influencing the price cuts, TI said. Disk subsystems affected by the price reductions include both the 32M-byte and 96M-byte versions of the CD1400 disk and DS50 50M-byte drive. Prices have been cut as much as 29% on the CD1400 and up to 21% on the DS50, TI said.

TI also notified customers of additional price changes including reductions on an optional DS10 10M-byte disk drive and a slight price increase on the firm's Model 911 CRT terminal. The terminal now costs \$200.

## Terminals, Storage, Printers Univac Adds V77 Peripherals

BLUE BELL, Pa. — Sperry Univac has added a series of CRT terminals, mass storage devices and printers to its V77 line of general-purpose minicomputers. The V77 gained transaction processing, data communications and language processing capabilities in April.

Mass storage for the V77 has been expanded to include a Winchester-type disk drive, the Model F3770, and a diskette subsystem, Model F3064.

The Model F3770 is available for users of the V77-500, -700 and -800 processors. The unit offers 70M to 104M bytes of memory; up to two drives can be governed by a single controller, the vendor said.

The unit includes a stack of 14-in. rack-mounted disks, with two read/write heads accessing both surfaces of each disk. The data transfer rate is 1.2M byte/sec, according to Univac.

The 70M-byte disk costs \$13,000.

### Diskette System

The Model F3064 diskette storage system, which costs \$6,500, is available for V77 systems using the Vortex II operating system. The floppy disk, dual-drive device is configured as two double-sided, double-density drives with a total capacity of 2M bytes — 1M byte per drive. Up to four 4M-byte drives can be used, the vendor said.

For IBM-oriented installations, the diskette subsystem offers IBM 3470 recording via user programming. That subsystem has a capacity of 1M byte per subsystem, according to Univac.

Univac also announced two CRT terminals for the V77. The UTS-20 and UTS-40 terminals offer microprocessor-based communications, and the UTS-

20 reportedly incorporates the full capacity of Uniscope 100/200 CRT terminals and UTS 400 functions and features. The UTS-20 costs \$3,200.

The UTS-40, like the UTS-20, features UTS-400 compatibility and adds up to 64K bytes of self-contained memory for \$4,160, Univac said.

Univac also announced the Model 0797 impact matrix printer, which attaches to UTS terminals operating on a V77 processor. The tabletop printer

features an 80-column line with a switch-selectable 6- or 8 line/in. option. The unit is microprocessor-controlled and costs \$1,900.

In addition, Univac announced an enhanced version of its Model 0798 200 char./sec printer. The unit features microprocessor control and operates in a bidirectional mode. It costs \$6,000.

Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

## Micro System Can Support Up to 225 Independent Users

CUPERTINO, Calif. — Molecular Logic Corp. has announced Dirac, a microcomputer system that can reportedly support up to 225 independent users by giving each one a 64K-byte microprocessor module that can access common data base via the firm's Mole bus.

Dirac features two microprocessor module types, one for disk storage management and the other dedicated to each individual user. The system also includes 30M bytes of fast disk storage and a standard 8-in. floppy disk drive for software interchange and data backup, the vendor said.

The system is based on the Z80 microprocessor and uses the CP/M operating system. The unit measures 11- by 24- by 30 in., and each unit can accommodate up to 64 user processor modules, which may be placed beneath a standard operator table, the vendor said.

The system is expandable without reprogramming. Additional user processor modules can reportedly be installed without shutting the system down.

A basic Dirac system costs \$9,000 and additional processors cost \$1,250 each, the vendor said from Suite 4A, 10311 S. DeAnza Blvd., Cupertino, Calif. 95041.

## System Runs With CP/M

PENNSAUKEN, N.J. — A multiuser small business system said to couple multiprocessor architecture with compatibility with Digital Research, Inc.'s CP/M operating system has been announced by Symcro Systems, Inc.

The Symcro SB70 was designed for first-time business computer users who need more power and expandability as well as for users of CP/M-based microcomputers who need an upgraded system with full software compatibility, the vendor said.

The system employs multiple Z80-based processor modules, each containing 65K bytes of random-access memory (RAM). (Continued on Page 50)

## Power Controller Fits VAX

SANTA ANA, Calif. — A three-phase ac power controller for Digital Equipment Corp. VAX-11 or other systems utilizing three-phase ac power has been announced by Marway Products, Inc.

The MPD-416 is interchangeable with the DEC 869 controller and distributes power in computer, industrial control and electronic test systems, Marway said.

Standard features include an EMI filter, transient suppressors, magnetic circuit breakers, local off-remote switch, deleted output for multicontroller sequencing and emergency shutdown, the company said.

The MPD-416 is priced at \$1,300 from Marway Products, Inc., 2421 S. Birch St., Santa Ana, Calif. 92707.

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## Z80-Based System

# Metafile Out in Fourth Version

CHATFIELD, Minn. — Sensor-Based Systems has unveiled Version 4 of its Metafile machine, an information system based on the Z80 microcomputer.

The data entry, update, search and reporting facilities available in this version run on the high-level Metafile language interpreter. The vendor claimed that applications written using Metafile declarative commands require 10% of the number of

lines of code as the same functions written in Basic or Cobol. Built-in text editing functions in Version 4 are used to prepare documents, forms and menus.

Data formulas may be merged into active text to produce display or print formats. The data-handling services of Metafile are said to be accessible via self-prompting commands. If complex processing is required, command procedures may be

composed and stored for later use.

The Metafile machine is offered in a stand-alone configuration suitable for desktop use, and mass storage capacities of .5M-, 1M-, 2M- and 5M bytes are available. A letter-quality or matrix printer can be attached.

Prices for the complete Metafile data system begin at \$8,000, the vendor said from the Olmstead Federal Building, Chatfield, Minn. 55923.

## Omni Disk Flip-Flops

MILLBURY, Mass. — A dual-sided reversible 5 1/4-in. disk allowing users to record on both sides for twice the storage capacity of a single-sided disk has been announced by Omni Resources.

The Flip/Floppy features two recording surfaces, two sets of write enable notches, two index holes and reinforced hub rings, the vendor claimed.

The five-pack Flip/Floppy is priced at \$21 from Omni Resources, 4 Oak Ave., Millbury, Mass. 01527.

## HP 3000 Bests 4331

(Continued from Page 49)  
inquiry and four terminals are used for programming in the home office. In addition, remote job entry stations in Scottsdale, Ariz., and Denver, Colo., facilitate large-volume data entry for financial applications.

"The HP 3000 has improved our entire operation. Not only has it improved our reporting capabilities, it has also helped increase our profit margins," he claimed.

The Bellmah Group is a \$70-million-a-year firm with operations in New Mexico, Arizona, Colorado and Oklahoma. The firm builds houses, does general contracting and provides land development, income property and corporate services.

## Unit Runs With CP/M

(Continued from Page 49)  
and serves two to 24 independent users at the same time while enabling them all to share a central data base, the company said.

An SB700 system configured to serve eight users is priced at about \$50,000 from Symco Systems, Inc., 7300 Crescent Blvd., Pennsauken, N.J. 08110.

## UP & RUNNING

### TERMINALS

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T1 787	2195	348	145
T1 810	1795	260	100
T1 820	2065	360	115
LA 34	1095	198	65
LA 120	2495	330	135
LA 100	1795	187	90
Visual 100	1550	187	80
Visual 200	1050	180	60
GE 2630	1450	230	72
Diablo 830 RO	2420	363	120
Diablo 840 KSR	2925	383	160
Diablo 1650 KSR	2995	363	165
H.P. 2621 A	1595	187	95
H.P. 2621 P	2750	312	165
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## Credit Unions Offered Turnkey Based on Micro

LIVINGSTON, N.J. — Dorset/SGI is offering a turnkey system designed for credit unions with fewer than 4,000 members.

The system uses the North Star Computer, Inc. microprocessor with two floppy disk drives, CRT display terminal, 18M-byte hard disk and a 200 line/min printer. It features a real-time system, conversational mode, operation ease and integrated general ledger, the firm said. More than 26 reports are said to be available with the system.

The system calculates loan payments, provides share draft processing, produces delinquent loan reports and general ledger trial balances. It can post payroll deductions and share-to-loan transfers and can write checks and receipts automatically, according to the vendor.

Insurance processing and word processing can be performed and mailing labels can also be produced based on selective criteria, the firm said.

The system is initially being offered for \$17,000 from Dorset/SGI, Livingston, N.J. 07039.

## Turnkey Aids Bottling Firms

HUNT VALLEY, Md. — A soft-drink distribution turnkey system for bottlers and distributors is being offered by Display Data Corp.

Designed as a companion to the firm's Beer Distribution system, the turnkey system reportedly controls and monitors route accounting, settlement, inventory control, sales and merchandising analysis, forecasting for sales and bottling operations and discount and promotion.

The system also performs a variety of general accounting functions integrated with the other system applications, according to the vendor.

The system can be expanded from a single terminal system to large on-line configuration, the firm said. The basic system includes a 64K-byte Insight CPU, CRT terminal, 10M-byte disk, 150 line/min printer, communications modem and complete soft drink route accounting programs.

Prices range from \$35,000 to more than \$100,000 for large on-line systems, with a typical price of about \$45,000. Lease terms are available, Display Data said from Executive Plaza IV, Hunt Valley, Md. 21031.

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## Microprint 121 Runs 10Line/Sec

SUNNYVALE, Calif. — A microcomputer-based printer said to provide any character subset as well as sample numbering, units labeling and minor calculations has been announced by Scientific Software and Instrument, Inc.

Microprint 121 prints up to 10 line/sec or 210 char./sec on aluminized paper using uppercase and lowercase with expanded characters and underlining features. Parallel and serial RS-232C inputs have transmission rates up to 9,600 bit/sec and double buffering allows continuous printing at maximum rate, the firm said.

The unit costs \$745 with quantity discounts available from 1028 W. Maude Ave., Sunnyvale, Calif. 94086.

## Unibus Users Get Disk System

SUNNYVALE, Calif. — A disk system based on a single-board controller said to interface with Digital Equipment Corp. PDP-11 Unibus machines has been announced by System Industries, Inc.

RMXO/6100 has a high-speed bipolar microprocessor design and reportedly operates with a variety of industry-standard storage module drives, including the firm's 80- and 300M-byte drives. The controller includes a four-sector static random-access memory data buffer and supports dual port drives and contiguous sector data transfers.

The system costs about \$10,000, the vendor said from 525 Oakmead Parkway, Sunnyvale, Calif. 94086.

## MSC 9800 Runs On HP-85 Gear

SUNNYVALE, Calif. — A disk drive subsystem that reportedly brings together a 5½-in. Winchester disk drive, 115V/230V power supply and a single-board controller has been announced by Microcomputer Systems Corp.

The MSC 9800 was designed for the Hewlett-Packard Co. HP-85 and other processing systems with the IEEE-488 interface, the company said.

The controller features automatic 22-bit error detection, 11-bit error correction, full-sector buffering, alternate sectoring and multiple sector transfers, the vendor said.

The MSC 9800 costs \$4,000 per single subsystem from 432 Lakeside Drive, Sunnyvale, Calif. 94086.

## Tailor Made For V/3000 Interface

Tailored for use with the Hewlett Packard System 3000, the DIRECT VP 828 combines the capability of the HP 2645/A with the personality and features of the DIRECT VP 800/B.

### Made a Direct Comparison

	DIRECT 828	HP 2645
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Monthly Service	\$18	\$19
Standard Memory	6K	2K
Maximum Memory	32K	8K
Local Tape Storage	No	Opt*
Printer Port	Std	Opt*
Fold-up Keyboard	Std	No
Self Test	Std	Std
Full Editing Capability	Std	Std
Protected Fields	Yes	Yes
Transmit Only Fields	Yes	Yes
Data Entry Checking	Yes	Yes
ANSI Complaint Mode	Std	No
VT100 Compatibility	Std	No
ANSI Buffered Editing	Std	No
PF-Key Combinations	16	8
Screen Phosphor	Grey (P-4) or Green (P-31)	Grey (P-4)
Block Mode Transmission	Yes	No
132 Columns	Std	560x216
Screen Resolution	800x320	7x9
Character Size	7x12	
Reverse Video	Std	Std
Blink	Std	Opt*
Half-Intensity	Std	Opt*
Underline	Std	Opt*
Line Drawing Set	Std	Opt*
Large Character Set	Opt*	Opt*
Math Set	Opt*	Opt*
Host Loadable Char. Sets	Std	No
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The OPTI 900\* Model 940 is the first in a family of electronic video terminals from Texas Instruments. Combining the power of an editing terminal with the convenience of video display, the Model 940 brings new perspectives to applications including data entry, electronic mail, commercial timesharing and data base management.

The 940 offers state-of-the-art human-factor design features to help reduce operator fatigue, and a variety of versatile characteristics to enhance any business application requiring high performance editing.

Standard display features on the Model 940 include a 12-inch diagonal screen with an operator-selectable format of either 80 or 132 columns by 24 lines. A 25th status line displays information in three selectable modes for functions like tabs, margins, errors or host computer messages.

The 940's display can be split both vertically and horizontally into separate data regions allowing a user the flexibility to operate within one region without disturbing another. And for applications like process control, the Model 940 features scrolling regions for quick, effective data comparison.



There is also a transparent print feature that permits a host computer to bypass the screen and transmit data to an optional local printer, allowing the operator continued use of the screen during the printing cycle. And the Model 940's memory can store up to 1,920 characters of data.

Featuring 128 displayable ASCII characters, the versatile Model 940 includes a unique combination of double high, double wide and double high/wide characters for display emphasis and reduced visual strain. Additional video features include 7×9 dot matrix characters with true underlining and true descenders.

The Model 940's detached keyboard, designed to increase operator comfort and productivity, is connected to the display monitor with a 6-foot coiled cord and features operator-oriented functionally clustered keys. For added user convenience the Model 940 also offers detachable nonglare screen filters and a tiltable display monitor

as options. Other available application-oriented options include international or graphic character sets and additional memory of up to 5,760 characters to give the 940 added versatility for data entry applications.

TI is dedicated to producing quality, innovative products like the new OPTI 900 Model 940 Electronic Video Terminal. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that come from 50 years of experience.

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## Mini Bits

### Ascii Vocalizer Converts Serial Data Into Speech

MOBILE, Ala. — The Ascii Vocalizer I from Micro Communications, Inc. converts serial Ascii data from a computer into speech as data is input through the Vocalizer's RS-232 interface.

The unit can be used as a stand-alone peripheral for paging, instructions, vocal reminders or any automatic speech output. It can also be added to an existing terminal to vocalize portions of the terminal display such as error conditions, operator messages or prompts. Vocabulary can be as large as 800 words, the firm said.

The Vocalizer contains an internal

amplifier, loudspeaker and an RS-232C communications interface that operates from 110- to 19.2K bit/sec. Many standard vocabularies and custom vocabularies can be supplied, according to the firm.

The basic unit costs \$1,395 and an Ebcidic model costs \$1,595 from the firm at Suite 214, 1509 Government St., Mobile, Ala. 36604.

### Dennison Kybe Brings Out Family of 5½-In. Disks

WALTHAM, Mass. — Dennison Kybe Corp. has announced a family of 5½-in. mini flexible disks for use on the firm's 96 track/in. quad-density disk drives.

The disks are available in both sin-

gle and double-sided formats. Individual disk capacity is approximately four times that of the original single-density minidisk, the firm said.

The flexible drives use about twice as many tracks grouped onto the same surface area as conventional dual-density drives.

The disks cost from \$3.75 for single-sided versions and from \$4.95 for double-sided versions, the vendor said from 82 Calvary St., Waltham, Mass. 02254.

### Ac Line Filter Boasts

### Built-In Surge Suppression

SOLANA BEACH, Calif. — PMC Industries, Inc. has introduced an ac line filter with built-in transient

surge suppression for use with all popular microcomputers, microprocessors, microprocessor-based scientific laboratory instrumentation and sensitive electronic and audio equipment.

The unit features 70 dba common mode and differential mode noise attenuation in the RFI frequency range from 150 KHz to 30 MHz, the noise range most troublesome to computers and computer-based instrumentation, according to the firm. The unit also features built-in transient surge suppression of spikes to 6,000A maximum at 50 Joules energy absorption.

The Model 032 has four three-wire outlets, 15A resettable circuit breaker, main on-off switch and indicator light and heavy-duty 6-in. shielded ac line cord.

It sells for \$215 from PMC at 1043 Sanata Florencia, Solana Beach, Calif. 92075.

### Device Lets Apple II Users Create Informational Slides

SAN FRANCISCO — An output device said to allow users of the Apple Computer, Inc. Apple II microcomputer to create informational slides has been announced by Toucan Co.

By drawing with a light pen on a graphics tablet, users can create full-color slides, creating squares or bars by touching two points, or circles by touching the center and a point on the circumference, the vendor said.

The Model T component package, including computer, tablet, software and reproduction module, is priced at \$8,500 from Toucan Co., 1033 Battery St., San Francisco, Calif. 94111.

### Micro Component Package Offered for LSI-11 Users

HAUPPAUGE, N.Y. — A rack-mountable microcomputer component package for Digital Equipment Corp. LSI-11 users, said to be expandable to accommodate additional floppy or Winchester disks, has been announced by North Atlantic Industries, Inc.

The WCF-1 contains I/O interfaces and 5½-in. Winchester and floppy disk drives, and up to 64K bytes of main memory can be provided using the LSI-11/2 or 256K bytes with the LSI-11/23, the vendor claimed.

The system can accommodate 12 dual-height cards from vertical mounting and the I/O interface has four RS-232C ports.

The WCF-1 with 64K bytes of random-access memory (RAM) is priced at \$8,500, and with 256K bytes of RAM, is priced at \$13,500 from North Atlantic Industries, Inc., 60 Plant Ave., Hauppauge, N.Y. 11787.

# BEEHIVE IS LOOKING for A FEW GOOD DISTRIBUTORS

Beehive International now offers a broad line of display terminals especially designed and priced for the distributor market. This product line includes three new smart ASCII terminals, the only competitively priced 3270 bisync emulator offered through distribution, and a true Burroughs TD830 emulator. These terminals are competitively priced and are based on product offerings with a history of reliable performance in a large variety of market areas.

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# OFFICE AUTOMATION



## Survey Finds WP Popularity Spreading

By Ann Dooley  
CW Staff

WILLOW GROVE, Pa. — Nearly 80% of the respondents in a recent Administrative Management Society (AMS) survey were found to be using or considering implementing word processing techniques in their companies. A 1976 AMS survey found that only about 63% of the same companies were then using or considering WP technology.

The nearly 17% increase in WP use over the last five years indicates the spreading popularity of word processing, according to AMS.

Survey responses this year came from 380 companies in AMS' "Committee of 500," which consists of management personnel in installations of all sizes located in 140 cities in the U.S. and Canada. The latest survey showed that 67.9% are now using WP equipment, .8% are currently implementing it and 10% are studying its feasibility.

In 1976, 47% of the respondents were using WP technology and 16.7% were studying its feasibility.

### Few Consultants

Although many of the 1981 respondents were new to the WP field, the survey showed that few companies used consultants to help select or implement equipment. Only 17.8% of those firms now using WP said they have used or are using a consultant to help determine their WP needs, the survey found.

Results also showed that many of the companies are making fairly major financial investments in WP equipment. Approximately 50% of the respondents reported that their firms use or plan to use over \$50,000 worth of equipment (in terms of purchase price). Another 14.7% placed their WP investment at \$30,000 to \$50,000 and 23.6% indicated their WP purchases amounted to between \$10,000 and \$30,000.

Less than 10% of the companies registered less than \$10,000 worth of purchased

(Continued on Page 56)

## DP Managers Look at Impact

By Ann Dooley  
CW Staff

What repercussions will office automation have for you, the MIS manager?

Ten executives interviewed recently regard the new technology favorably and hope to effect moderate to substantial changes in their departments through new word processing applications.

All of the managers interviewed reported their departments are utilizing office automation — two are still in the implementation stages — but most users have not proceeded beyond WP applications. While one large insurance company has implemented electronic mail and calendar scheduling in addition to WP applications and two Massachusetts manufacturers have begun offering either facsimile communications, corporate support functions or message switching, most of the managers are providing only WP functions to users.

However, office automation is experiencing slow growth, according to John Simpson, director of systems for American Home Products Corp. in New York. Several managers noted that each new application — including word processing — is undergoing close scrutiny by top management, which is requiring intensive cost justification.

All but one of the managers indicated that they are directly involved in either the initial selection of their company's WP equipment or the actual implementation of the WP applications.

The majority of the DP executives do not believe that WP will greatly impact their jobs — most see it as an enlargement of the scope of their responsibilities and view it as just another service to provide to users. The vice-president of data processing at one company noted that his company's DP manager would have to become more concerned about field operations and other areas outside the traditional DP arena.

Several others noted that the users themselves will be responsible for the function. One executive pointed out that WP constitutes an extra function in an area unfamiliar to DP management. But, he said, the benefits will be appreciable because the applications will provide quicker and cleaner information to senior management.

Seven of the 10 managers see WP as a subsidiary to the DP department, while three companies have established it as separate functions or under the jurisdiction of the users. However, several of the managers noted that when office automation reaches its full potential it will evolve into a separate entity. One DP director predicted office automation would eventually be like a marriage to DP with both being equal partners.

## Xerox Introduces Unit for Ethernet

By Bob Johnson  
CW New York Bureau

NEW YORK — A workstation for the Ethernet network that can be used for word processing or as a personal computer has been released by Xerox Corp. as part of its office automation product line.

The 820 information processor, which can also operate stand-alone, is geared for the entry-level WP marketplace, according to Xerox. The basic system, which sells for \$2,995, consists of a Zilog, Inc. Z80 microprocessor with 64K-byte random-access memory and 4K-byte read-only memory, a 24-line, 80-char. video display screen, a standard 96-char. keyboard with a 10-key numeric pad and two 5 1/4-in. Shugart SA4000 disk drives with a 92,000-char. capacity.

A 40-char./sec. Diablo 630 daisywheel  
(Continued on Page 64)

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## Desktop System Functions As Multipurpose Station

ROCKVILLE, Md. — Alanthus Data Communications Corp. has entered the office automation market with a desktop computer called the Alanthus System 1000 that the company said performs like a minicomputer, looks like a terminal and functions as a multipurpose workstation.

The system is intended to be used for applications like data entry, word processing and financial and business modeling.

The basic system consists of a detached keyboard, a 15-in. CRT terminal, a processor with 128K- or 256K bytes of user memory, disk storage and has the ability to communicate with other System 1000 workstations or local networks. Up to 16 workstations can be clustered with a total of one million bytes of storage memory, the firm said.

The System 1000 does not use the

traditional concept of a CPU, but distributes processing power and data storage capacity throughout the multifunction workstations.

As workstations and storage modules are added, the power of the system expands. At the same time, all operating software and application programs remain compatible and the hardware can be reconfigured according to the user's needs, the firm stated.

Alanthus has entered into an agreement with Convergent Technologies, Inc. of Santa Clara, Calif., the manufacturer of the System 1000, to market and service the equipment, as well as develop selected application software.

The System 1000 ranges in price from \$13,000 to \$27,000. Alanthus can be reached at 6011 Executive Blvd., Rockville, Md. 20852.

## International Systems Marketing Unveils Home/Office System

BETHESDA, Md. — International Systems Marketing, Inc. has introduced the Intersystem Model 40, a business/word processing system for use in the office or home.

The unit is based on a 64K-byte Z80 microkeyboard and includes a keyboard, 12-in. CRT display with 80- or 132 col by 24 lines and two 5½-in. floppy disk drives with a total of 2M bytes.

Peripherals may be attached via one RS-232 interface and one Centronics Data Computer Corp. parallel port.

Digital Research, Inc.'s CP/M operating system is standard. Dot matrix and formed character printers are available, the firm said.

The Model 40 costs \$4,195. Other models available are the 10, 20, and 30, which range in price from \$2,295 to \$3,595.

The Models 20 and 30 include disk storage of 500K bytes and 1M byte respectively.

International Systems Marketing is at 5161 River Road, Building No. 20, Bethesda, Md. 20016.

## WP Popularity Found Growing

(Continued from Page 55)  
equipment. No response was given by 7.4% of the respondents.

The average WP user surveyed by AMS had purchased stand-alone CRT terminals with separate printers, possibly from more than one vendor. This user has invested more than \$50,000 worth of equipment to be used as a supplement to standard typewriters in fairly standard business applications.

According to AMS, slightly more than 56% of the respondents are using or considering stand-alone CRT units with separate printers. The next most common choice was stand-alone units with some auxiliary media and the third choice among the respondents was stand-alone electronic typewriters with limited memory and no display.

Next most commonly used were multiterminal shared resource intelligent terminals followed by multiterminal dumb terminals and then stand-alone electronics with "thin-window" display. Time-sharing with terminals linked to an outside computer was the least frequently used.

Purchase was found by the survey to be the most popular means of acquiring equipment, with 40% answering that this was the method they selected. What's more, 55% said they were willing to mix vendors.

After purchase, the next most common method of acquisition was the lease-only plan, followed by a com-

bination of lease and purchase. Lowest in popularity was rental.

WP has by no means taken over from the typewriter, according to the survey. Less than 6% of those polled use WP to handle all their typing jobs. The majority of companies use a combination of WP and standard typewriters to handle the typing function; more than 90% noted their non-WP secretaries have access to regular typewriters.

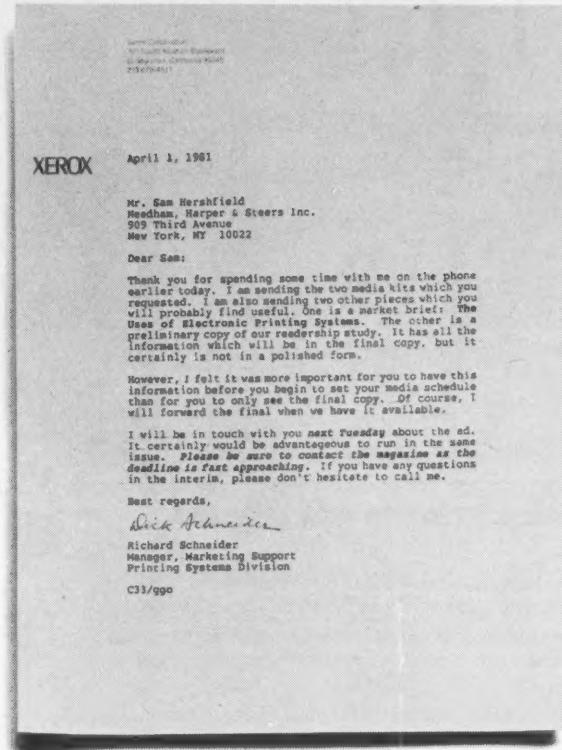
Nearly half of the respondents use or are thinking of using WP equipment for performing the three functions of typing: original (one-time) letters, form letters and text editing. Repetitive typing and text edit functions were used by 20% of the user companies.

Few of the companies use equipment only for one-time jobs or for a combination of one-time jobs and text editing applications.

Approximately 75% of the users utilize either a telephone dictation system or desktop dictation units along with submitting hard copy. The survey showed that nearly 25% use non-automated methods of input such as handwritten or typed hard copy.

The survey results appear in AMS' *Management World's "Guide to Word Processing"* issue, which also includes a directory of WP equipment and vendors and other WP information. The issue costs \$5 for nonmembers. AMS said from 2360 Maryland Road, Willow Grove, Pa. 19090.

# DON'T PRINT A LETTER A LETTER AT A TIME.



Printing word processor output can be a time-consuming process. Because most word-processing printers print a page a character at a time.

But the Xerox 5700 Electronic Printing System prints a page a page at a time. And that can be up to 40 times faster than typical printers.

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The 5700 lets you control how the printed word will appear. You can select from virtually unlimited type styles and sizes, or print certain words **bold** or in *italics*. It will even reproduce your signature or your company logo.

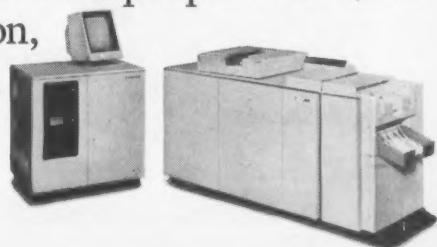
The 5700 can print reports, documents, proposals, or specifications directly from magnetic media. And it accepts input from communicating word processors. But it's much more than just a word-processing printer.

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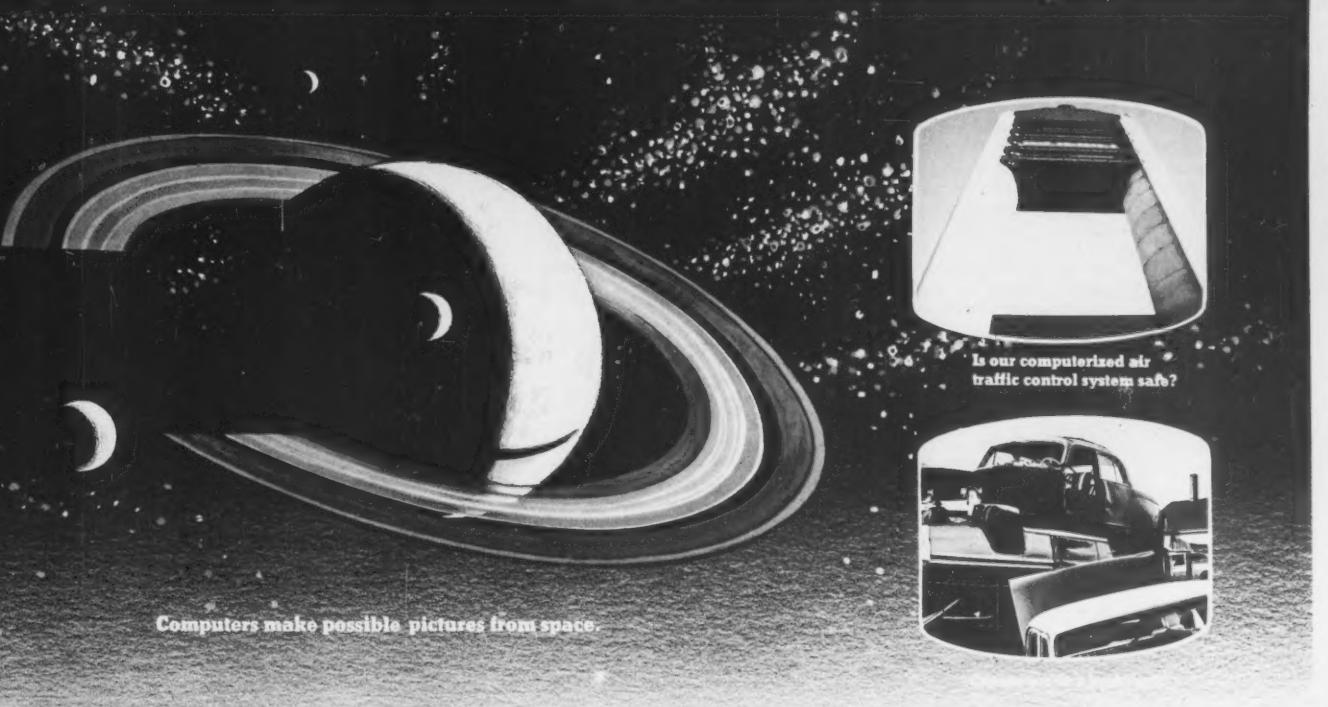
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# Lexitron VT Emulates 3275

THOUSAND OAKS, Calif. — Lexitron Corp. has broadened the communications capabilities of its VT word processor line with the introduction of an IBM 3275 emulator software option.

The software option, self-contained on a minifloppy disk, allows a VT 1202 or VT 1303 equipped with communications hardware to emulate the IBM 3275 Model 2 display station using the binary synchronous protocol, the vendor said.

The emulating VT can then perform a variety of alphanumeric display functions such as simple, interactive or complex inquiry applications and all data or order entry applications in a stand-alone mode.

#### Data Interchange

With the 3275 diskette loaded in the VT workstation, the operator can interchange data with a host computer via an RS-232C interface, modem and public or private telecommunications net-

work, Lexitron said.

In addition, the terminal can be remotely attached to an IBM System/3 models 4, 8, 10, 12 and 15 via a Bisync adapter or to System/3 models 8 and 12 via an integrated communication adapter.

The IBM 3275 Model 2 screen is emulated by a 1,920-character screen format on the VT 1202 or VT 1303. The program operates on a

menu selection basis, the vendor said.

The emulator's purchase price is \$950 per program diskette. It is also available on a 12-month lease at \$235/mo. If a VT workstation is not already equipped for communications, a field upgrade can be made for \$1,200.

Lexitron is located at 1840 DeHavilland Drive, Thousand Oaks, Calif. 91359.

## Communications System Boasts WP Capabilities

WASHINGTON, D.C. — Compression Labs, Inc. unveiled three models of its Multifunction Communications System that feature word processing capabilities and handle Telex, TWX, Direct Distance Dialing, leased-line, private Telex and 2789 Bisynchronous Communications Protocol messages.

The Models 141, 241 and 341 have character-code-to-facsimile-code translators

that allow incoming messages to be converted automatically to facsimile format and then forwarded (or refiled) to facsimile machines. The 141 has one communications port, the 241, two, and the 341, three.

The system, including printer, flexible disk drive and single communications port costs \$8,500, CLI said from 2305 Bering Drive, San Jose, Calif. 95131.

FAIRFIELD, N.J. — A high-speed CCITT Group III digital facsimile transceiver with a 9,600 bit/sec step-down modem and optional CCITT Group II compatibility has been introduced by Rapicom, Inc.

Designed to provide electronic mail service for international and domestic communications networks at an optimum speed of 15 sec/page, the unit accommodates large-volume applications exceeding 1,000 document/mo, according to the vendor.

The Model 6300 permits unconditioned phone line transmission of all types of graphic forms such as typewritten and handwritten letters, charts, drawings, sketches and diagrams. The 6300 will automatically read eight shades of gray.

#### Auto-Fallback Feature

Compatible with all existing Rapinet facsimile products, the Model 6300's 9,600 bit/sec modem speed has auto-fallback to 7,200, 4,800 or 2,400 bit/sec. Multiple resolution transmit modes are available for High-Speed, Standard and Fine Detail. Original documents of low-contrast or multicolor printing can be compensated.

The Rapicom 6300 also features Short Protocol, which permits the user to select handshaking protocol for transmission-time reduction up to 6 sec.

The Secure Turnaround Polling mechanism further reduces telephone line charges, the firm said. When transmission of a document is complete, the transmit lo-

cation will automatically poll the receive locations to pick-up its mail on the same call. This feature will also prevent unauthorized access to the transmit terminal, Rapicom noted.

The 6300 permits unattended reception and features push-button and dial-selectable operator controls. It sends and receives documents automatically. The Model 6300 costs \$12,000 from Rapicom, 7 Kingsbridge Road, Fairfield, N.J. 07006.

## Ziegler Offers Letterwriter For IBM 5280

ORANGEBURG, S.C. — Ziegler and Co. is offering a Letterwriter package for the IBM 5280 Distributed Data System.

The Letterwriter allows the IBM 5280 to operate in an environment similar to that of a word processor, allowing for the creation and storage of letters or documents. The Letterwriter allows for line insertion, deletion and enlarging the length of the document automatically. The 12-in. CRT terminal displays 20 lines at a time with preset margins allowing for 75 characters per line.

The Letterwriter is being offered at an introductory price of \$250 including source code and a money-back 30-day free trial. More information is available from Mo Yarborough, Ziegler and Company, 1173 Boulevard, N.E., Orangeburg, S.C. 29115.

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## Wang OIS Line Gains Magnetic Tape Drive

LOWELL, Mass. — Wang Laboratories, Inc. has added a peripheral device to its Office Information Systems (OIS) product line with the introduction of the Model 6509 9-track magnetic tape drive.

The Model 6509 acts as a storage medium for disk backup and off-line storage. In addition, the 9-track magnetic tape drive is an easily transportable data interchange medium between the OIS and other systems that

support a compatible tape drive, the firm claimed. The Model 6509 supports a 1,600 byte/in. phase-encoded tape and meets Ansi standards. The peripheral operates on the OIS 105, 115, 125A, 130A, 140 and 145.

The Model 6509 costs \$16,000 from Wang at One Industrial Ave., Lowell, Mass. 01851.

## Philips Adds WP System, Software

NEW YORK — A word processing system designed for the low-end information processing market and two software packages were introduced by Philips Information Systems, Inc.

The Micom 2002 in its minimum configuration consists of one CRT workstation, a Zilog Z80A processor or controller with 128K bytes of available memory on two floppy disks, a 45 char./sec daisywheel printer and basic software. It costs \$8,450 and is available in 30 days.

A version that can include up to four workstations, two printers, mass storage on a Winchester disk in 9M-, 27M- or 45M-byte capabilities and communications will be available in the first quarter of 1982.

Philips noted that the one-workstation model allows the terminal to be 8 ft from the controller, but upgraded versions will allow remote units to be at a distance of up to 300 ft.

### Standard Software

The standard software on the system includes editing, file management, discretionary search-and-replace, multiple margins, instant locate, storage and instant retrieval of frequently used words, subscript and superscript, graphics and statistical typing.

Optional Micom software available for the 2002 includes Powerpak I with sort, records processing and key-stroke memory and Powerpak II, which has all of the above plus Mathpak, for four-function mathematics. All of the software is fully integrated to eliminate re-programming for capability modifications, according to Philips. Powerpak I sells for \$975 and Powerpak II for \$1,625.

Philips is based at 4040 McEwen, Dallas, Texas.

## Electronic Mail System Bows

TORRANCE, Calif. — Computer Communications, Inc. is offering an electronic mail system that allows users to edit messages, send messages, obtain a summary of messages in an electronic "mailbox" and read, answer, reroute and discard messages.

The user is assigned a password that authorizes access to the electronic mailbox and assures privacy. As the messages arrive and are stored for retrieval by the owner, or user, of the mailbox, a summary of the messages — including the name of the sender, the subject and the time of ar-

rival — is made available, according to the vendor.

The user may also scan all messages and select the ones desired to be read in full. Messages can reportedly be rerouted and prior to rerouting, the messages may be edited.

The basic system includes the vendor's CPU with 256K bytes of memory, 160M-byte disk file, 16 dial-in ports and two control terminals for \$200,000. The software costs \$30,000 for a perpetual license from the firm at 2610 Columbia St., Torrance, Calif. 90503.

## The new look in low-cost data entry.

It's the brand new HP 2622 block mode terminal from Hewlett-Packard.

With its high-resolution character cells, forms firmware and full display enhancements, the 2622 gives a dazzling screen performance for jobs like data entry and retrieval.

But what makes this terminal look even better is its price — just \$2075.

### Drawing the most from your system.

The HP 2622 display station goes beyond the standard low-cost block mode features. With its format mode and optional line drawing sets, you can design forms just like the ones your people are used to working with. And there are two full pages of scrolling memory to help make everything picture clear.

But the HP 2622 is more than just a flashy screen personality. It has a typewriter-style keyboard with separate numeric keypad for quick and easy data entry; eight user-definable soft keys; self-diagnostics for high reliability; even an optional built-in thermal printer for hard copy at the touch of a key.

See how good your system can look with the HP 2622. For an eye-opening demonstration, call your local HP sales office listed in the White Pages. Or return the coupon to Hewlett-Packard, Attn: Tom Anderson, Dept. 398, 974 East Arques Avenue, Sunnyvale, CA 94086.



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\*In Texas, call 1-800-442-5030.

## Evolution Series II Gets Jet WP System

ORANGE, Calif. — The multi-user Jet word processing system for its Evolution Series II data management system was released here by Evolution Computer Systems Corp.

Jet is reportedly fully integrated with Evolve, Evolution's relational data base management system, and supports up to 64 concurrent users. The vendor said that 65 char./sec., 80-col letter-quality printers and 80 char./sec., 80-col dot matrix, rough draft printers support the Jet system.

The system is also said to support high-speed line printers operating at up to 1,200 line/min and to be

able to spool up to four of these concurrently with 16 remote character printers.

"Electronic filing cabinet" features enable users to send files to archival storage or save them for future use on high-density magnetic tape media or bulk mass storage, the vendor said.

Jet is available immediately at \$1,995, or at the reduced price of \$1,395 when purchased concurrently with any Series II data management system from Evolution, the vendor said. Evolution Computer Systems is located at 250 E. Emerson Ave., Orange, Calif. 92665.

## Packages for Xerox 860 Include Link With OS/6

DALLAS — Two software packages for the Xerox Corp. 860 information processing systems are being offered by Xerox. One package allows the 860 to process information from a disk prepared on an IBM OS/6 system.

The OS/6 disk can be inserted directly into the 860 disk drive for conversion, reading and processing. A disk created on an 860 can also be converted for use by an OS/6 system.

The same package also provides conversion of data received via Teletype-mode communications from a remote computer, OS/6 or other processor, to the 860 records processing format.

The second software package provides automatic positioning of footnotes for 860 users. Footnotes can be entered at the same time the body of the text is being typed or at the end for automatic merging.

The one-time license fee for the conversion software is \$800. The footnote program will be distributed free to Xerox 860 customers. More information is available from the Office Products Division, Xerox, 1341 W. Mockingbird Lane, Dallas, Texas 75247.

## Xerox Unveils Ethernet Unit

(Continued from Page 55)

printer and software for the 820 is optional. The price with the printer is \$5,895. Software is priced separately.

The Xerox 820 can run under the Digital Research, Inc. CP/M operating system or on Xerox's own WP system. Ethernet compatibility is provided through the network's 872/873 communications servers or through the 871 interactive communications emulator for IBM 3270-mode access to a host computer.

The 820 supports four ports, two RS-232 serial ports and two parallel ports.

According to a company spokesman, Xerox will market the 820 through new distribution channels — independent retail stores and dealerships. The units will also be sold through Xerox stores, distributors and the company's Office Products Division sales force.

The systems are immediately available. More information can be obtained from the Xerox Office Products Division, 1341 W. Mockingbird Lane, Dallas, Texas 75247.

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# COMPUTER INDUSTRY

## Revenue Share Eroding

# Micro Mart Growth Seen Threat to IBM

**GREENWICH, Conn.** — The expanding market for microcomputers will have a progressively adverse impact on IBM's market position, which by 1986 could drop to a revenue share of less than 15% of system shipments, a market research firm here recently forecast.

IBM's revenue share totaled 55% of all DP shipments in 1956; today that share is about 25%, the Gartner Group noted in its recently published *IBM Viewpoint* series.

The industry giant's market share will continue to erode as mainframe shipments decline as a percentage of total equipment shipments, according to Greg Leveille, director of custom research for the Gartner Group. Even though mainframes are expensive, they are not so expensive as to maintain the revenue edge they enjoyed during the past 25 years.

### Drastic Slippage

Already revenue share slippage has been drastic. In 1956 mainframe vendors accounted for 100% of all DP revenues, but by 1980 that revenue share had dropped to 61% because of the influence of new classes of companies, most notably mini

makers. The proliferation of microcomputers and new vendors of those systems is becoming the major reason for continued erosion, Leveille said.

Explaining the decline, he noted mainframes represented 16% of the 64,000 units shipped in 1976, but will represent only 1% of the 2.4 million units forecast to be shipped in 1986 (see accompanying charts).

### Mini, Micro Shipments

IBM had an 84% share of unit shipments for mainframes in 1956, but by 1986 that share will be 71%. More important, the report observed, IBM will have only a 9% share of minicomputer and only 5% of microcomputer shipments by that time. But minis and micros will account for 99% of shipments by 1986, the firm forecast.

IBM has been and will continue to be unable to control the diffusion of technology held by other vendors. The performance of microcomputers has improved about 93% annually since 1971, the research firm said. Moreover, the number of vendors in all sectors of the market has escalated dramatically. In 1972 IBM had 618 competitors, but by last year there

Equipment	1956	1966	1976	1986
<b>Mainframes (\$100,000 and Up)</b>	100%	70%	16%	1%
<b>Minicomputers (\$15,000 to \$100,000)</b>	—	30%	75%	31%
<b>Microcomputers (Less than \$15,000)</b>	—	—	9%	68%

Source: The Gartner Group

### Unit Shipments by Type of Equipment

	1956	1966	1976	1986
<b>Mainframes</b>	84%	—	—	71%
<b>Minicomputers</b>	—	6%	—	9%
<b>Microcomputers</b>	—	—	11%	5%

Source: The Gartner Group

In this chart showing the IBM share of equipment shipments, the figures in boxes relate to IBM's entry into specific market segments and share by 1986.

were 3,000 market participants.

IBM will maintain its dominance in the mainframe market, but it will place about third or fourth for minis and won't have any chance at all of dominating microcomputer distribution channels, Leveille maintained.

The 11-volume *IBM Viewpoint* series is available in single volumes or as a set for \$3,200 (\$2,600 for Gartner clients) from 545 Steamboat Road, Greenwich, Conn. 06830.

## Voice Tech Firms Set for Market Boom

By Robert Batt

CW West Coast Bureau

With a market that International Resource Development, Inc. (IRD) sees growing from \$5 million in 1980 to \$3.1 billion within 10 years, computer-based voice technology companies are gearing themselves up for what they hope will be a huge explosion in demand for their products.

According to the major vendors, there is already a perception in the marketplace that voice technology will make available innovative applications in the computer field and make more efficient those data processing tasks that are currently time-consuming and burdensome.

National Semiconductor Corp. is one of the major companies actively engaged in this field. "We feel speech is the kind of product that offers users substantial productivity gains. Speech is a more informative type of application than some of those currently available because it gives the user information in such a way that he knows exactly what to do with it," a spokesman for the company said.

Voice technology can be divided into three components:

- Voice recognition — where people talk to the computer.
- Voice synthesis — basically, talking terminals.
- Voice compression — a digital method of analyzing speech.

Most companies specialize in one or another of the respective markets, although a few — like Centigram Corp. of Sunnyvale, Calif. — are involved in all three fields. "The growth potential in the market is just phenomenal. It is our objective to

(Continued on Page 73)

### • R&D Focal Point For Digital Speech

With digital speech still a pioneer technology, there is little doubt that research and development will continue to be the driving force in the marketplace.

Most of the current R&D is devoted to eliminating errors, enhancing voice quality and improving the price/performance ratio. "The digital speech business is so new that there are relatively few skilled engineers and scientists who have devoted sufficient time to the field to become experts," Gerard Currie, Centigram Corp. president, noted. "In addition, there are very few companies solely devoted to all aspects of the technology — coding or analysis, synthesis, transmission and recognition."

Parametric and waveform coding are the two main forms of digital speech currently available. Waveform techniques attempt to match the synthesized speech to the original speech waveform. A typical method is pulse code modulation (PCM), where the waveform is sliced up in time and then broken into one of 256 levels. The level number representing the level nearest the actual waveform is the digitized speech. Such a technique is relatively easy to implement and is useful if bandwidth is inexpensive.

### For Parametric Techniques

In parametric techniques, on the other hand, a mathematical model of speech generation process is used, such as in linear predictive coding (LPC).

(Continued on Page 72)

### • Players' Lineup In Voice Tech Game

These are the major players in the voice technology game:

#### Centigram Corp.

Formed in 1977, the company's first product was a data entry product, called Mike, used in voice recognition. Since that time, it has developed two other products: Lisa, a speech synthesizer, and Vopac, a voice packetizer recently introduced at the International Communications Agency (ICA) show in Washington, D.C.

Centigram claims to be the only company currently specializing in all areas of digital speech. Its areas of interest include voice recognition, speech synthesis and specialized voice-oriented hardware.

Lisa, for example, is geared toward the education market in an environment where the user frequently requires voice prompts for training operators as in the case of insurance companies with thousands of clerks entering claims. The aim of Lisa is to make such a terminal audio-visual so the introduction of speech as an additional communication device is conducive to more rapid learning.

Indeed, Centigram sees a whole vista of possibilities in the world of commerce and finance. Gerard Currie, company president, said: "One of our major objectives is to get into the brokerage and banking industry in a big way. There is no reason why data bases cannot be used for obtaining market quotes through the use of digital speech. This is a very large market because there are thousands of brokerage

(Continued on Page 74)

# ICL to Sack 20% of UK Workers; Loses \$64.4 Million in Half Year

By Matthew May

Special to CW

LONDON — The news that almost one in five people are to be sacked from International Computers, Ltd.'s (ICL) UK operation was followed swiftly by the half-year results that revealed a loss of \$64.4 million.

Justifying the need for a further layoff of 5,200 people, Managing Director Robert Wilmot claimed that recovery would only be possible if costs were reduced quickly. Even with the projected scale of future business, the company is still overmanned, Wilmot said.

The number of layoffs, which reduced the total work force from a peak of 34,000 in 1979 to less than 25,000, will come as only a slight surprise to those involved. When the prospect of a takeover by Sperry Univac was possible, ICL management predicted around 5,000 jobs would have been lost.

The work force has not had an easier ride from the new management and few believe that the plans were not well in hand before the fresh triumvirate took up their positions. Contrary to some impressions, ICL's state of decay has little to do with revenues per employee.

## Plunge in Profits

Last year's revenues per employee were \$41,000, an increase of 19% which, with the exception of IBM, does not compare too unfavorably with other major manufacturers in the UK. It is rather the inability of ICL to sell at a profit that causes the problem — earnings per share were halved in 1980.

The layoffs will occur after the usual 90-day consultation period has expired.

A thousand of the layoffs will be overseas while the manufacturing group will lose a further 1,700 despite the group's having already lost 2,500 jobs last autumn from the closure of its Winsford factory.

## Sale to CDC

The closure of the plant, which was sold to Control Data Corp., was followed by consultation between management and a joint trade union committee, but when this broke down, the union officials claimed they would not repeat similar talks.

The new layoffs, then, will meet with strong union opposition and little chance of any amicable solution. Despite a weak position if the unions carry out their threats to strike, the most disruption would be likely from ICL

employees refusing to maintain those data processing departments already hit by the civil servants' strike.

ICL's loss of \$64.4 million breaks down into \$46.4 million for the first quarter and \$18 million for the second.

The figures would appear encouraging but for the fact

that the company's streamlining will cost it nearly \$80 million, and new orders are down 4%.

Revenues for the first half of the year were 8% lower than the corresponding period last year at \$605 million.

*May is a staff writer for Computerworld UK.*

## HP Top DP Vendor In Bay Area: Survey

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — Hewlett-Packard Co. continues to be the No. 1 computer-based company in the Bay Area, according to recently released statistics. With computer sales outstripping revenues from instrumentation equipment for the first time in the company's history, HP has climbed to seventh position for all the companies in the region.

The survey, published in the *San Francisco Examiner*, reveals that of the top 85 companies in the Bay Area, more than one-quarter (22) are computer-based with accumulated revenues in 1980 of more than \$8.5 billion.

In the top 25 companies along with HP, with revenues of \$3.1 billion, are National Semiconductor Corp. (\$980.4 million), Intel Corp. (\$854.6 million) and Memorex Corp. (\$768.7 million).

## Critical to Economy

In fact, the survey noted, together with oil exploration, information processing is the critical component in the area's economy, which gives rise to the widely held belief that Bay Area companies are somewhat immune from recession.

"The historical roots of the area's prosperity are tied to the changing patterns of commerce in the United States. If the profits from oil and the high-flying technology companies are subtracted, the results look similar to those in other areas," the sur-

vey said. The differences in the economic bases of regions have a variety of effects that finally show up in corporate profits. According to the U.S. Department of Commerce, growth in capital spending in the West has outstripped that in the Northeast and Midwest by 250%.

## Dramatic Earnings Jump

This has resulted in a growth rate three times as fast as other slow growth regions and has simultaneously pushed up inflation-adjusted salaries at twice the rate of old-line manufacturing areas.

The result has been spectacular increases in 1980 earnings — with a 117.2% earnings jump for Tandem Computers, Inc. of Cupertino, the most outstanding example.

HP moved from the No. 12 spot in 1979 to No. 7 with an earnings performance in 1980 of \$269 million, while Intel, the Santa Clara manufacturer of integrated circuits, moved up from 21st last year to 18th with a 29% increase in sales to \$855 million from \$663 million.

Both Intel and National Semiconductor, which moved up five places to No. 14 through a profit increase of 53% in 1980, have been suffering a little from the drop in demand for chips, but the survey said they can be expected to continue as a dominant force in the Bay Area economy.

## Rest of Itel Inventory Acquired by NAS

MOUNTAIN VIEW, Calif. — National Advanced Systems (NAS) has acquired the remaining inventory of Itel Corp.'s computers, peripheral equipment, spares, a U.S. government lease base and the residual interest in Advanced System computers already leased to users.

The value of the transaction totaled \$41.8 million, but

that amount may be reduced if NAS obtains releases of certain obligations Itel has with former customers, NAS said.

The transaction, which ended NAS' business relationship with Itel, was primarily financed by \$34.1 million in seven-year 12% notes and was approved by the U.S. Bankruptcy Court.

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The latest annual user ratings survey from Datapro Research Corporation shows computer users across the country rate Magnuson's M/80 mainframe computer Number One for "overall satisfaction."

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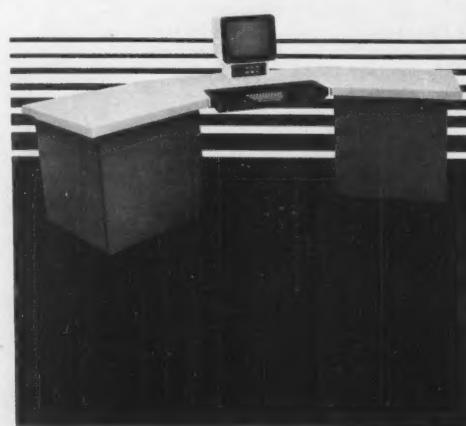
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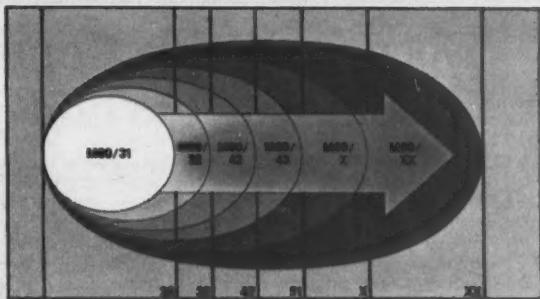
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CW 6/22/81



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## Burroughs Closes Plant

**DETROIT** — Burroughs Corp. phased out its Goleta, Calif., operation earlier this month and is reducing employment at other plants in Michigan and California.

The primary product produced at Goleta was the B1900. Manufacture of that system will continue in volume in Burroughs' plants in New Jersey and Belgium.

A significant portion of the 592 employees at the Goleta plant will be offered employment in other Burroughs facilities, the firm said. The labor reduction in the other plants will total about 370 workers.

By Rita Shoor  
CW Staff

**NEWTON**, Mass. — If you're selling an application development package to software wholesalers for in-house product development, a documentation guide written by software engineers for other software developers is probably sufficient.

But if you begin marketing the same package to user organizations — software customers rather than wholesalers — your documentation requirements may undergo a radical change. Enter John Kirsch, president of Techwriting Affiliates here and a

specialist in the delicate art of communicating between software engineers and the market that they serve.

Currently a lecturer on technical communication at MIT's School of Engineering, Kirsch also runs Techwriting Affiliates, a consulting firm specializing in this area. He started the two-year-old firm because he "saw a need for services that would enable software engineers to explain a product to the market."

Software vendors seem to agree with him about the need for this type of documentation. The approach taken by Prime Computer, Inc. and Informatics, Inc. with the Terminal Application Processing System (Taps) package illustrates this.

When Informatics, Inc. acquired Taps last year [CW, Oct. 20, 1980], the majority of its client base was comprised of software houses. Historically, some 70% of the Taps sales had been made to firms such as McCormack and Dodge Corp. and On-Line Systems, Inc. for application development, according to John Splavec, vice-president in charge of business development at the Informatics Corporate Development Group.

### Reference Manual

Taps documentation was in the form of a reference manual that essentially described the "internal architecture rather than the user-friendly aspects" of the application development tool at that time, according to Kirsch.

Informatics insists on "top-flight packaging" and the Taps "productization efforts had some distance to go to meet our standards," Splavec said. The vendor plans to exploit the end-user market with Taps more heavily than it had in the past. A management concepts document targeted to end users and upper management thus became a necessity.

In February, Informatics retained Kirsch to evaluate Taps communications requirements. The fundamental problem was to explain the capabilities of the systems that can be developed with Taps to users who are not DP oriented, Kirsch noted. "A great deal of documentation had been generated about the product, but none of it really geared in on what the application was."

Software development tools like Taps demand cooperation between an organization's programming staff and its end users, he said. There is a need to show the end user what requirements they could "naturally expect to be fulfilled".

Kirsch's solution for Informatics is a three-part concepts manual. The first section is structured for DP management, Splavec said. Another section focuses on the end-user, and part three consists of a Taps overview designed for top executives. Together with a reference manual that serves as a "dictionary for the application developer" and a user's guide scheduled for July availability, the vendor is ready to tap the end-user market.

Kirsch's work at Informatics actually came about via a consulting assignment with Prime, where he was working on "essentially the same problem."

The vendor acquired the marketing rights for Taps in a Prime environment [CW, Oct. 27, 1980] and contracted with Kirsch to develop a user's guide for Prime/Taps. Like Informatics, Prime is eyeing the Taps end-user market and recognizes the need for documentation that is intelligible to nontechnicians.

Why did Prime go to an outside consultant to solve the documentation problem? The "writing staff was completely committed to other projects at the time," said Shields Flynn, group manager for data management products at Prime. There just was not enough time to incorporate the Taps project in its long-term planning cycle, he said. Prime's writers are not plagued by what he called the "not invented here syndrome" — characterized by a negative attitude about anything from the outside world. Going to Kirsch was a "good business decision to make at the time," Flynn observed.

The change in marketing emphasis may have been prompted when a new module was added to Taps, according to Flynn. The addition of a data manager to the Taps communications interface and program manager modules freed users from developing application systems in Cobol. The data management function contains pre-coded commands that make Taps "more accessible by people with less DP experience," he said.

## Supershorts

Structural Dynamics Research Corp. (SDRC) has announced a newly formed subsidiary, CAE International. President of the new company is Dr. Joe R. Frazier, former general manager of the SDRC manufacturing engineering services division.

Mathematical Applications Group, Inc. (Magi) has raised \$1.65 million by a limited partnership to develop an interactive three-dimensional modeler.

Micro Development Associates has changed its name to Micro Technology, Inc.

Automatic Data Processing, Inc. has formed the Electronic Financial Services Division to provide automatic teller machine services to banks and thrift institutions throughout the U.S.

General Instruments Corp. has formed a new Computer Products Division, which will be responsible for the design, manufacture and sale of selected components and subassemblies used in the computer industry. It will be headquartered in El Paso, Texas.

Data General Corp. has shipped its 100,000th computer system in the company's 13-year history. The system, a 32-bit Eclipse MV/8000, went to Chevron International Oil, Inc., a subsidiary of Standard Oil Co. of Calif.

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# Seeks Well-Monitored Plan House Explores Implementation of NTT Pact

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Fragmented monitoring responsibilities may jeopardize U.S. implementation of the recent trade pact opening to U.S. firms \$3.3 billion in annual equipment bids of Japan's Nippon Telegraph and Telephone Public Corp. (NTT), a House of Representatives subcommittee was recently told.

Worked out during five years of laborious negotiation, the three-year trade agreement was reached last December. According to testimony presented Tuesday to the House telecommunications subcommittee, it is too early in NTT's procurement cycle for any U.S. firms to have won contracts under the agreement.

The purpose of the hearing, according to subcommittee Chairman Timothy Wirth (D-Colo.), was to make sure implementation of the agreement is well monitored. Representatives of both the Commerce Department and the U.S. Trade Representative's office assured Wirth their agencies are following the matter closely.

Raymond J. Waldmann, assistant Commerce secretary for International Economic Policy, briefed the subcommittee on steps his department has taken to provide U.S. firms with the information needed to bid on NTT contracts.

He told Wirth a number of Commerce offices and committees are working to advise American firms of NTT opportunities and to facilitate contacts between those firms and NTT officials.

He assured the subcommittee the Japanese have moved rapidly to implement the agreement, but cautioned that "American firms must not underestimate the challenge of preparing to compete effectively for NTT business."

"NTT has long relied on exclusive supplier relationships involving extremely demanding commitments by suppliers for quality and reliability, so that only a handful of Japanese companies have previously been able to supply NTT," Waldmann noted.

ed.

"Casual U.S. effort will not suffice," he said. "The attraction of NTT procurements are great, and American firms will face intense competition from newly eligible Japanese as well as foreign firms."

Similarly, Assistant U.S. Trade Representative W. Douglas Newkirk said, "NTT has made commendable efforts to show their good faith in implementing the agreement." Nevertheless, he added, the proof of Japanese intentions will be in how the procurements are actually handled.

Newkirk promised his agency will follow closely implementation of the agreement it worked out as part of

the Tokyo round of the Multilateral Trade Negotiations.

John Sodolski, vice-president of the Electronic Industries Association, told the subcommittee, "It has been unclear as to whether the monitoring function should or did reside with the Office of Trade Representative or with the Department of Commerce.

## Monitor Argument

"There are those in our industry," Sodolski said, "who feel the monitoring of the agreement ought to be the responsibility of those who negotiated it" — namely, the Trade Representative.

"It has been observed there is little

institutional memory in the U.S. government," he explained. "We fear the intricacies of the negotiations that led to the agreement, and indeed the intricacies of the agreement itself, may be lost if the monitoring function is distanced from those who negotiated and signed the agreement."

Sodolski said the industry is following closely the steps both governments are taking to facilitate the pact. However, he said, "it is only fair to state at this point" NTT has yet to purchase any equipment from American firms. "We sincerely hope that situation will change in the near future," he said.

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## New Companies

**Advanced Information Management Technology, Inc.** is an information management consulting firm specializing in technology transfer and videodisk technology. The company is located at Suite 2B, 1311A Dolley Madison Blvd., McLean, Va. 22101.

**Home Terminal Systems, Inc.** has been formed to provide support services to organizations offering or planning to offer computer services in the home. The company will be headquartered in St. Petersburg Beach, Fla., and can be reached through P.O. Box 66869, St. Petersburg Beach, Fla. 33736.

**Innovative Service Corp.** has been formed to provide cleaning, refurbishing, data recovery and preventative maintenance for computer memory media including disk packs, cartridges, tape and floppies. The company is located at 64 Alric Court, San Jose, Calif. 95123.

**Interdata, Inc.** is an independent consulting firm that will apply current computer technology to the improvement of commodities firms' operations and will also perform general management and systems consulting for exchanges and member firms in the commodities industry. Interdata is located at 1110 W. 41st St., LaGrange, Ill. 60610.

**Datafacts International Ltd.** is a computer information publishing company located at 706 N. Dearborn, Chicago, Ill. 60610.

**Western Business Computers, Inc.** will work through established independent distributors to market brand-name small business comput-

er systems and services to end users. The company is located at Suite 272, 2025 Gateway Place, San Jose, Calif. 95110.

**International Finance Group, Inc.**, a leasing and marketing consulting company for the computer industry, is located at 71 Lewis St., Greenwich, Conn. 06830.

**Digilog Business Systems, Inc.** has been formed to market worldwide the Digilog Series 1000 family of low-priced business computers for Digilog, Inc. The company is located at Babylon Rd., Horsham, Pa. 19044.

**The Lynbar Group**, an international marketing organization for manufacturers of electronic equipment, has been formed by H. Barry Maser, former president of Delta Data Systems Corp. Lynbar is headquartered at 3741 Ridgeview Road, Huntington Valley, Pa. 19006.

Saul Kuchinsky has concluded a 28-year career with Burroughs Corp. to form **Quantum Systems**, an organization and product development consultant firm. Quantum is at 451 Millcrisp Road, Bridgewater, N.J. 08807.

Harry Katzen, Jr. has founded **Katzen International Computer Consulting, Inc.**, a firm specializing in systems design and development, performance analysis, capacity planning, communications systems architecture, simulation studies and general EDP consulting. Katzen is based at RD 3, Box 356, Stillhouse Road, Freehold, N.J. 07728.

**Advanced Data Resources**, formerly the computer sys-

tems division of Advanced Offices, Inc., is an independent computer corporation specializing in solving com-

prehensive record-keeping problems. The firm employs seven people and is based at 111 Twin Oaks Drive, Syracuse, N.Y. 13202.

**Dynatech Corp.** has formed **Dynatech Packet Technology, Inc.**, which will manufacture and market products in the X.25/X.75 market-

place. It is located at 7664-A Fullerton Road, Springfield, Va. 22153.

**Medical Data Management, Inc.**, a company that provides financial management software systems to the health care industry, is located at 6240 Carlisle Pike, Mechanicsburg, Pa. 17055.

## Contracts

**Alpha Systems Corp.** has signed a \$500,000 OEM agreement with Seagate Technology for the purchase of Seagate's ST 506 disk drive, which will be included in the Alpha AS-105 subsystem.

Tymshare, Inc. has signed a contract with Matra, a major French manufacturer of telecommunications equipment, for the purchase of 100,000 personal computer systems.

**CEA Division of Berkleonicics, Inc.** has received a contract valued at more than \$2,300,000 from Harris Corp. for several types of linear and switching power supplies.

M/A-Com, Inc. has announced that one of its operating subsidiaries, Digital Telecommunications, Ltd., has signed three contracts totaling more than \$3 million to provide satellite earth stations and additional channel units for Telesat Canada.

**Computer Terminal Systems, Inc.** has received orders totaling some \$1.25 million from Raytheon Co.'s Data Systems Division to build airline boarding pass printers and airline ticket printers.

The Air Force Electronic Systems Division will contract Systems and Applied Sciences Corp. to develop six communications systems control elements for the Army.

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## Mergers & Acquisitions

**Kappa Systems, Inc.** has reached an agreement in principle with **Micronet Services, Inc.**, whereby Micronet will acquire 57% of Kappa's common stock.

**Hogan Associates, Inc.** of Dallas has announced the acquisition of **Online Delivery Systems, Inc.**

**Reap, Inc.** has acquired 100% of the stock of **Northwestern Consolidated Industries, Inc.** of Lebanon, N.H., as well as 100% of **Teledata** and 83% of **Savings Management Research Corp., Inc.**

**General Electric Information Services Co.** has expanded into data processing

management consulting, as well as design and development services for in-house computer systems, with the acquisition of **Lambda Technology, Inc.**, a New York supplier of custom-designed software services.

**GTE** has announced the sale of its **GTE Comp-Act** business to **Computerized Restaurant Systems, Inc.** The terms of the sale were not disclosed.

**Tymshare, Inc.** has acquired **Applied Systems Corp.** of Bethesda, Md., and two franchises of **Telecheck Services, Inc.**, located in Washington, D.C., and in Philadelphia.

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# Digital Speech Focus on R&D to Continue

(Continued from Page 65)

Here, the speech process is modeled as pulses driving a filter. The pulses are a crude representation of the vocal cord and the filter is a model of the throat, mouth and tongue. Numbers representing the filter, spacing and amplitude of the pulses are the digital representation.

Unlike waveform, which requires 32K bit/sec (bips) or

more for quality speech, parametric speech operates at lower bit rates, often as low as 2.4K- and 4.8K bips, but is much more expensive to implement.

#### Centigram's Solution

Until recently, the choice has been between high bit rate/high-quality speech or low bit rate/low-quality speech. Centigram claimed it

has solved this problem with a technique known as parameterized waveform coding (PWC). The firm's spokesman said PWC produces transparent speech, whereby 75% of listeners do not realize they are hearing digitized speech.

"If one is observing waveforms, then change is occurring continuously, but if one is observing models, the change is congruent with the changes in the sound. Model parameters may be used for 50 msec on average. So, for example, using 24 parameters at six bits each, we get a rate of 2,880 bips using PWC, compared with 21,600 bips through waveform techniques," Currie noted.

In practice, it is not always that simple, he added. Models tend to change in unpredictable ways, but a bit rate of 4,880 bips is regularly attainable.

However, to go as low as 2,400 bips requires sophisticated techniques, such as taking advantage of the very short pauses in the middle of words and being able to store up bits during slowly changing words such as 'smooth' so as to have them available during faster words such as 'indubitable.'

The major technological problem in the industry is the dichotomy between speaker-dependent and speaker-independent systems and discrete vs. continuous word recognition," according to Barry Schiffman, president of Heuristics, Inc., a Sunnyvale, Calif., manufacturer of voice products.

Voice recognition requires that parameters be generated and stored so that subsequent words can be compared to the stored library. Errors usually arise through a device wrongly recognizing a word or substituting one for another. The problem of speaker-independent speech recognition is a major one, hence the potential importance of techniques such as PWC.

"Preliminary analysis suggests that less than two years will be required to produce a significant breakthrough in speaker independence and the use of large vocabularies," Currie added.

Speech compression techniques are important also because they possess great productivity advantages through the more efficient use of bandwidth devices. For example, by digitizing speech at 2.4K bits, a user could put four voice channels on a transatlantic line, thus making fuller use of the high-cost line.

Using algorithm methods, technologists are attempting to create a bit stream and

then make it redundant. This requires techniques to reduce extra bits, and a lot of research is being carried out to reduce the bit rate of any bit stream.

Much of the technology is extremely sophisticated. For example, some companies are working on problems such as pitch extraction — the process of hearing voice

sounds and decoding them accurately — and spectral analysis, where the sound is converted into a minimum bit or digital representation after the pitch information is extracted.

To remove all the information stored as a subset of a waveform and to do it in a transparent manner is proving extremely difficult.

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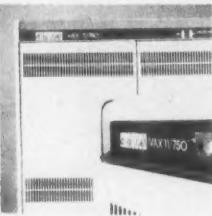
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## Voice Technology Firms Set for Market Explosion

(Continued from Page 65)

become the speech products company by having the largest share of the end-user and OEM markets through access to superior technology," said Gerard Currie, Centigram's president.

With IRD forecasting the market for voice input-output devices alone to reach \$1.5 billion by 1988, Centigram, formed in 1977, aims to become a \$50-million-a-year company within three years.

One of the reasons voice technology specialists have such optimism is the wide range of potential applications from inventory control to non-technical military operations. Time and Space Processing, Inc. (TSP), specializing in interfacing voice and data, sees the commercial market as the most promising area of development, according to Ken Krechmer, the company's vice-president.

"Although 70% of our business is in the military field, we are trying to increase our commercial applications. We feel that five years from now the commercial market will be the largest market for our products. In particular, we need to come up with easy interfaces to the analog and data environments, especially those linking telephone systems around the world," Krechmer said.

### Dual Potential

One of the major advantages of voice technology is that its potential seems equally applicable to both the office of the future and to assembly line techniques. For example, in the world of business and commerce, digital speech is seen as a potentially powerful productivity tool in cutting the cost of long-haul telephone circuits or in areas where voice privacy is desirable, as in commodity training. In factories, operations already requiring the use of the eyes and hands, such as quality control inspections, are amenable to voice techniques.

However, to take advantage of such user potential, big strides are needed in improving the state of the art. "Almost everybody recognizes that voice is a technology that will come. The question is when is it coming and is the current voice quality/system performance ratio suitable for today's user. We haven't yet reached a standard for voice quality where the decision to buy is only based on cost factors," Krechmer continued.

Nevertheless, the lure of voice technology is such that multinational giants such as IBM, Honeywell, Inc. and Sperry Univac are getting into the field, as are the pure digital speech specialists.

All of them have to operate within the parameters of the technology currently available — namely, parametric and waveform coding. Within parametric techniques, a technique known as linear predictive coding (LPC) is gaining popularity.

LPC is a mathematical process used to compress information into smaller bit forms (between 2,400 and 4,800 bit/sec), thus making more efficient use of bandwidth. However, such processes are relatively expensive to implement, which is one of the rea-

sons for the slow growth of speech technology to date.

In addition, as with the successful introduction of any new technology, there is a user education problem to overcome. This is proving particularly difficult in digital speech technology. As Currie put it, "Unfortunately, the market has been hyped too much and hasn't developed as well as it might because users' expectations of talking to computers has been limited in practice to only a few applications. At the moment, in voice recognition, devices have to be strained for a particular voice and the environment must be noise-free."

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- Arnold Miller has been chosen to head Xerox Corp.'s electronics division as vice-president.

- Jeannette P. Meier has been named vice-president, secretary and general counsel for Pertec Computer Corp. Also at Pertec, Frank B. Ensign Jr. was named vice-president and corporate controller, and Mel Wellerstein has been named vice-president of marketing for the peripherals division.

- Charles F. Barber, chairman and chief executive of Asarco, Inc., has been elected to the Burroughs Corp. board of directors. News at Burroughs also includes the promotion of David J. Rynne, who had been vice-president of corporate financial planning, to the position of corpo-

rate controller. Rynne succeeds Thomas E. Garvale, who has retired after 33 years with Burroughs. Also, Philip Dauber, a former IBM executive, has been elected a senior vice-president, technical operations.

- Harold M. Kosakoff has joined Megatek Corp. as corporate controller.

- Robert P. Drum has been appointed vice-president of United Bank New York (UBNY) Data Services, Inc.

- Frank Parisi has been promoted to vice-president of sales for SEI Corp.'s Eastern Region.

- Donald J. Daniel has been named vice-president and Minneapolis branch manager of Lawson Associates, a software consulting firm.

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# Players Lining Up in Voice Technology Game

(Continued from Page 65)  
offices throughout the country."

\*\*\*

## Time and Space Processing, Inc.

Time and Space Processing (TSP) specializes in interfacing voice with data, particularly in the military field that currently accounts for more than 70% of its business, which last year reached \$6 million.

Ken Krechmer, vice-president, explained the importance of digital speech. "In the military you can encrypt a digital data stream in a complex and convoluted manner, making the system very secure because it is difficult to decode. To attempt this process using analog technology would make adverse and drastic

changes to the quality of the voice, rendering the information virtually useless," he said.

Krechmer said secure communications were particularly important during peacetime because if information is compromised by an opponent he can simulate it and have time to react. "The key is to achieve a bit rate of 2,400 bit/sec. If you want military secure communications over a telephone or radio, you need compressed bit rates," he added.

Voice digitizers are the backbone of the company. TSP claims that without these devices there are millions of people who are trained to interrupt and monitor conversations. This number can be drastically reduced using a voice digitizer, Krechmer

said, thus having a significant impact on security.

Later this year the company plans to introduce its latest digitizer, which it hopes will offer major improvements in interfacing with voice and data networks. "At a systems level we are hopeful it will sound a great deal better than current 2.4K-bit devices," Krechmer added.

TSP said the new product, known as Model 1000, would be 10 to 100 times more powerful than its current Model 100 and will cost around \$12,500.

"We are going to build more complex products while the price remains flat. Only when we have fully got the product right will we look at dropping the cost. This could be sev-

eral generations away," Krechmer said.

\*\*\*

## Heuristics, Inc.

Heuristics claims to be the first company to develop a circuit board-level speech recognition device for use with personal computers. The company said its strategy is to hit competitors with better price/performance products costing less than \$5,000 in both the system-level and circuit board models.

Barry Schiffman, company president, added: "We aim to get into all segments of the speech recognition market when products perform at the level of customer expectations. We do not intend to go into the chip business because we do not feel it is up to the quality required."

\*\*\*

## National Semiconductor Corp.

One company that does think digital speech chips are worth thinking about is National Semiconductor, which has been steadily increasing its involvement in speech synthesis and recognition.

With the introduction of its DT 1050 Digitalalker synthesis system last year, the company is hoping to tap big-volume markets such as the automotive and telecommunications industries. At the same time, National Semiconductor says it sees a need to develop systems that allow users to produce their own words in-house and much research and development effort is going into this.

\*\*\*

## Verbex, Inc.

Verbex's System 1800 system is generally regarded as the best speech recognition product yet devised, although at a typical installation price of between \$80,000 and \$120,000, market penetration has been minimal to date.

The system is one of the few that is voice-independent over a telephone and does not require the use of a microphone. The key to its technology is the use of a very fast processor (32-bit machine) for building up a proprietary data base of spoken words. Applications include parcel sorting, where an operator speaks out a Zip Code and the parcel goes into the correct posting channel.

Mike Harvey, Verbex's president, outlined the company's strategy. "Our first task is to have a successful installation and gain market acceptance. Then we can move across application and industry lines until voice recognition becomes commonplace in the office and the factory. It is a latent market waiting to be tapped," he added.

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## Orders & Installations

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Standard Federal Savings and Loan Association, Columbia, S.C., has awarded Docutel Corp. a contract for 17 Series 2300 automated teller machines.

**South Suburban Hospital, Hazel Crest, Ill.**, has signed a contract with Spectra Medical Systems for the installation of the Spectra 1000 Hospital Information System.

The Commercial Systems Division of Computer Automation, Inc. has completed the shipment of 16 Syfa systems valued at more than \$2.1 million to Commonwealth Edison of Chicago for the utility's Syfa distributed processing network in use at all of the major generating stations of this Midwest utility.

**Bunker Ramo Corp.** has signed a renewal contract with Dean Witter Reynolds totalling approximately \$16 million for continuation of Bunker Ramo's System 7 market information services in the brokerage firm's branch office network.

Carleton Corp. has signed a software license agreement to supply Shell Oil Co. with Carleton's Auditec system. The package will be used by Shell's corporate auditors during field audits at Shell's various IBM data centers.

**Chatsworth Data Corp.** has received an order from the American Stock Exchange for 50 Model 4900 optical card readers.

The Ford Design Center, Dearborn, Mich., has ordered a Sperry Univac 1100/60 to perform numerous functions involved in the design of cars and trucks.

**Fidelity Union Life Insurance Co.** of Dallas has contracted with AM Jacquard Systems for 13 J500 stand-alone multifunction computers, software, maintenance and training.

New York Telephone Co. has concluded negotiations with Creative Socio-Medics for the final implementation of a comprehensive health-care management information system. In addition, New York Telephone has selected Harris Computer Co. as the hardware manufacturer for the on-line distributed data processing network that will run under the Mumps operating system.

**Thomson McKinnon Securities, Inc.** has signed an agreement with an approximate value of \$13.5 million to extend for five years Bunker Ramo Corp.'s System 7 market information services in its 104 domestic branch offices.

Applied Communications, Inc. has received five new electronic funds transfer (EFT) contracts to provide computers, software and services for

EFT processing to Albuquerque National Bank, BayBanks Data Services, Inc., Credit Systems, Inc., Gesco Corp. and National Bank of Detroit.

**Lundy Electronics and Systems, Inc.** has received an order from Ford Motor Co. for 18 computer graphics CRT workstations to be used in its computer-aided design/computer-aided manufacturing (CAD/CAM) systems activity.

The U.S. Geological Survey has purchased three additional processors and increased memory capacity for a previously installed Honeywell, Inc. Multics 68/80 large-scale computer system. The system expansion, valued at \$5.3 million, will allow the

agency to expand its efforts in the analysis of earth data.

**Planning Research Corp.** has been awarded a contract to manage the computer center of the Prince George's County, Md., government.

Bishop Computer Center, a division of Bishop Trust Co., Ltd., Honolulu, Hawaii, has received a contract to convert the financial processing programs for the Department of Finance, County of Hawaii, from an IBM System/3 to a Wang Laboratories, Inc. VS/80.

**Cray Research, Inc.** has received orders for Cray supercomputers from three major petroleum compa-

nies. Arco Oil and Exploration Co. installed its computer in February; Exxon Production Research Co. ordered a Cray-1 S/4400 and Shell Corp. has leased a system.

Massillon Community Hospital, Massillon, Ohio, has ordered an integrated, on-line, real-time patient information system from National Data Communications, Inc.

**Sanders Associates, Inc.** has received an order valued at approximately \$2.8 million from Messerschmitt-Bolkow-Blohm GmbH, Munich, West Germany, for continued production of Sanders' Graphic-8 digital television displays.

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## Computer Science Instructor

Walters State Community College has a Hewlett-Packard 3000 III Series. A state supported community college in East Tennessee, WSCC offers a two-year associate degree in Computer Science and a minimum of three years experience in Computer Technology or closely related field required. Masters degree preferred, with demonstrated skills desirable. New month contract beginning Sept 1981. Salary commensurate with experience and qualifications. Send resume and transcripts to:

**Personnel Officer**  
**Walters State**  
**Community College**  
**Morristown, TN 37814.**

WSCC supports Equal Employment Opportunity in Education and Employment.

## MOVE UP TO COLORADO

We're the world's largest manufacturer of high performance tape and disk storage equipment and a major producer of high speed line printers. We are innovative, aggressive and constantly looking ahead to advance our technology further into the future. We're Storage Technology Corporation, a Fortune 500 company located at the base of the magnificent Rocky Mountains and just minutes away from Denver. Immediate career opportunities are available for qualified professionals in the following areas:

### Operations Research

Provide optimum configurations of related IBM equipment in respect to performance. Will recommend and implement increased productivity of the Data Resource with cost effective solutions and provide consulting and operational problem solving as needed. Requires BSEE, BSME, or BSCS and 4-6 years technical or data processing experience.

### Marketing Product Line Planner

Assure timely new product and product life cycle plans that are responsive to market opportunities and which optimize total business results; establish market and product priorities; and recommend development investment levels. You will also identify and document market requirements for new products; review and approve new product specifications; develop and integrate market and marketing strategy plans for new and existing products; and seek out and develop market penetration opportunities for STC products outside as well as within the IBM base. A minimum of 8-9 years industry or user experience required with a proven planning background. Sales or marketing experience and knowledge of IBM and/or other vendor systems software a must.

### Systems Programmer

Work with a team of systems programmers installing, maintaining, and enhancing IBM VM, OS/VSI, and MVS operating systems on an Am-dahl V6, IDMS data base system, communications network and software packages, or TOPS-10 on a DEC-10. Additional responsibilities to include:

- Monitoring computer resource utilization and tuning the system.
- Developing standards and guidelines for the use of computer resources.
- Providing technical assistance and developing specialized program tools for users.

Requires a college degree, or equivalent, and 3-7 years systems programming experience. Thorough knowledge of computer hardware, software and human relations skills a must.

### Senior Programmer/Analyst

Duties include the analysis, design and implementation of computer programs in engineering areas; defining engineering hardware/software requirements; and selection, installations and maintenance of software packages. Requires a BSEE, BSCS or equivalent, and a minimum of 5 years technical and data processing experience. Background should include systems analysis and project leadership with engineering application software on IBM and/or DEC PDP-10 systems using Fortran, PL/I, or APL. CAD or graphics experience an added plus.

STC offers an excellent compensation package including health, dental and life insurance benefits, stock purchase plan, competitive relocation assistance and much more. Please send your detailed resume in absolute confidence to **Mr. Patrick Hart, STORAGE TECHNOLOGY CORPORATION, Dept. CW 6/22, 2270 South 88th St., MD #29, Louisville, CO 80027**. We are an equal opportunity employer.



## SYSTEMS PROGRAMMER

R.J. Reynolds Tobacco Company, an affiliate of R.J. Reynolds Industries, Inc., has an excellent career opportunity in its Information Systems Department for an experienced Systems Programmer.

Requirements include experience with:

- DEC model 20
- TOPS 20 operating system
- System 1022 data base
- Experience with DEC-11's (RSX-11M) a plus

This position offers opportunity for further professional growth and development. Salary commensurate with experience and ability. Winston-Salem, N.C. location with excellent fringe benefits. Send resume with salary history in confidence to: **Mr. J.R. Coupland, Corporate Recruiting Manager, R.J. Reynolds Industries, Inc., World Headquarters, Winston-Salem, NC 27102**.



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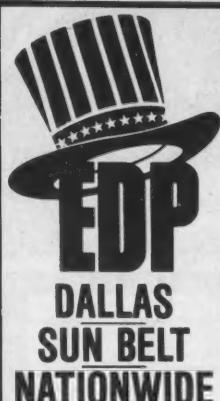
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Programmers, Analysts, Software Specialists: Let us assist you in your career advancement as we have hundreds of computer professionals like yourself since 1970.

In Dallas, our clientele consists of virtually every major data processing installation as well as numerous smaller organizations. Nationally, through our network of 30 offices, we represent thousands of career opportunities across the entire U.S. Send our professionals your resume or call us today!



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If you're looking for affordable housing in an area with no state income tax, consider the growth opportunities our clients have for:

- Programmers
  - Analysts
  - Systems Programmers
  - Project-Leaders
- Desire experience with any of the following disciplines:
- COBOL or ASSEMBLER
  - On-Line exp with CICS
  - IMS
  - 3+ yrs. large-scale IBM
  - Insurance or Financial Systems Design/Programming

If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, why not contact us to explore your career goals & objectives. We are dedicated to being worthy of your trust & confidence.

**compass, inc.**  
900 Asylum Ave.,  
Hartford, CT 06105  
(203) 549-4240

We are an equal opportunity employer retained search & placement firm.

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**NEW HAMPSHIRE**  
**\$25 - \$45K**

Applications and Systems Software  
Micro/Mini Mainframe



Management Advisory Services Inc.

Colonial Office Park  
48 Constitution Drive  
Bedford, NH 03102  
(603) 472-8844

Fees and relocation expenses company paid.

## BUSINESS SYSTEMS ANALYSTS AND PROGRAMMERS IMS - DBA'S

The Management Systems organization of TRW's Defense and Space Systems Group has immediate opportunities for Business Systems Analyst and Programmer professionals seeking answers to today's information systems problems. TRW-MS is in a growth mode affording potential promotional opportunities to the right individuals. If you have 2 or more years of experience in any of the following areas, we would like to talk with you.

### PROGRAMMERS/ANALYSTS IN COBOL AND/OR FORTRAN

#### Business Applications and Systems:

- Manufacturing
- Procurement
- Inventory
- Capital Planning
- Financial Cost Information
- Personnel
- Payroll
- Accounts Payable/Receivable
- Financial Consolidation/Forecasting
- Interactive Financial Modeling

#### Data Base Administration

#### Distributed Data Processing

#### ENVIRONMENT:

**Hardware:** IBM 370-158, 3032, 3033, 4300, Prime 550, HP 1000 & 3000, PDP 11/70, HP Graphics, Cyber Series, VAX 11/7080, DATAPOINT, RAMTEK 6214

**Software:** IMS (Batch & Online), TSO/SPF, Structured COBOL, MVS/JES2, FORTRAN, VSAM, BASIC, ADF, PASCAL, PL1

We offer a unique campus-like working environment, excellent salaries and a benefits package that includes FLEXITIME, medical/dental/vision plans, a Christmas week shutdown and a liberal relocation policy.

For immediate consideration, send your resume with salary history in confidence to:

**SHEILA PELL**

**Bldg. E1/Room 4029 - CW 6/22  
One Space Park, Redondo Beach, CA 90278**

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**A Company Called** **TRW**  
DEFENSE AND SPACE SYSTEMS GROUP

#### MIS MANAGER

Dynamic international bank, located in Midtown Manhattan, seeks a seasoned data processing professional with excellent communication skills to manage a five-person staff. You will report to a divisional senior vice-president and your responsibilities will include: "management of the company's data center" management of the systems and programming function "determination of short and long range data processing requirements including future hardware and software needs."

Candidates should have 7-10 years experience with international banking systems and NCR/IRX/COBOL knowledge. Managerial and planning skills are essential. This individual will play a key role in supporting our continued growth and will have full backing of top management.

A competitive salary and excellent fringe benefits are offered. Interested candidates should send their resume, salary history and requirements to:

**CW Box 2597  
375 Cochituate Rd., Box 880  
Framingham, MA 01701**

#### SYSTEMS AND PROGRAMMING MANAGER

Leading financial institution in Mobile, Alabama, has an opportunity for a Systems and Programming Manager. • Accomplishments should include experience with an IBM mainframe operating under VS1 or MVS in a teleprocessing oriented environment. CICS desired. COBOL experience required. • Applicant must have a B.S. in Computer Science or Business and have several years programming and systems analysis experience. Additionally at least five years experience is required in systems and programming management, preferably in banking. • Salary commensurate with experience. Attractive fringe benefits package. • Send detailed resume and salary history to:



**S. Breaux Daniel, Manager**  
Human Resources Development  
First National Bank  
P.O. Box 1467  
Mobile, Al. 36621

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## A move to Northwest Alaskan Pipeline Company might be the most important move of your career.

We realize many companies restrict their employees' ability to be innovative and fail to challenge their potential. At Northwest Alaskan, we encourage continuing challenge and career growth. That's why we feel a move to our Irvine, California office might be the most important move of your career.

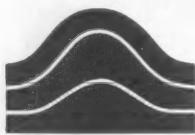
### EDP AUDIT MANAGER

We currently have an opening for an individual to assist in the development of effective EDP audit programs as they relate to new systems under design. Additionally you will assist in systems application and data processing operations. These programs should determine the effectiveness of controls and operations in the MIS divisions. Position requires 7-10 years experience in an EDP audit environment. A Bachelor's degree in computer programming is required with an advance degree preferred. Must possess proven management capabilities.

### SENIOR EDP AUDITORS

We also have openings available for Senior EDP Auditors. The ideal candidates will have a degree in Business or Computer Science with 5-7 years programming and systems analysis experience. Additionally, 2-3 years of EDP auditing experience would be desirable.

If you are interested in challenging your abilities, make your move to our expanding energy company. We offer an excellent salary and benefit package. For immediate consideration, please send your resume INCLUDING SALARY HISTORY to: Herman G. Best, Northwest Alaskan Pipeline Company, C/O Fluor Engineers & Constructors, 3333 Michaelson Drive, Irvine, CA 92730.



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## \$2500

if you refer a friend we hire for...

### Director of Software Products Development & Acquisition For a 'driven' person with great energy

★ ★ ★

**Are you or do you know someone who:**

- Has successfully led the development of user friendly on line software products? (Project Planning & Control, Automated Design & Productivity Aids, etc. a plus)
  - Possesses strong and current state-of-the-art on-line technical experience
  - Is interested in negotiating the acquisition of software products as well as building products
- CW Box 2585, 375 Cochituate Road, Framingham, MA 01701

### Computer Specialist

The management systems development directorate of the naval aviation logistics center, located in scenic southern Maryland, about 60 miles from Washington DC, has openings for (3) GS-12 computer specialists. Positions will be in an ADP Management office - a centralized ADP support service providing consultant, monitoring and planning support. Positions will specialize in the areas of: automatic data processing, equipment and telecommunications analysis; analysis of ADP under management information systems; automated information systems life cycle management, and business administration principles and practices in large scale production and/or industrial environment utilizing data base management systems. Forward personal qualifications statement (SF-171) to:  
Civilian Personnel Department, Rm. 117, Naval Air Station, Patuxent River MD 20670. Call Brenda Dale, 301-863-3347 for further information.

### PERSONNEL CONSULTANT

I am interested in speaking with Consultants with a minimum of 1 years agency/recruiter experience in the placement of programming and systems professionals. This individual will manage our DP Department at our N.J. office and eventually will supervise a "team" of (3). Salary to \$35,000 plus incentive bonuses and excellent benefits plan. Please phone in confidence Monday-Friday, 9-5PM, 201-467-8700, SAM FUSCO (President), Steeple Associates Inc., 55 Morris Ave., Springfield N.J. 07081.

The Corporate Research and Technology Department of Siemens Corporation has exceptional opportunity for a Computer Scientist or Electrical Engineer with strong CS background. Position is the field of communications technology, computer security and cryptography provides both the scope for the full utilization of your skills and the potential for advancement to project leader or manager.

Successful candidate will have a broad mathematical background and experience with high level language (PASCAL), microcomputer systems and computer communications. A Ph.D. or M.S. in either Computer Science or Electrical Engineering is essential.

Siemens is a world leader in electronics located near the historic area of Philadelphia. Our employees enjoy excellent working conditions and a benefits package that includes dental insurance, savings plan and tuition refund. To join us, please send resume including salary requirements in confidence to: Ms. Barbara Zimmerman.

**Siemens Corporation**  
Corporate Research & Technology  
3 Computer Drive  
Cherry Hill, New Jersey 08034

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### ROBERT HALF

#### SUNBELT POSITIONS

●	APL	\$36K	●
●	DATA BASE CAD	\$36K	●
●	DATA BASE DESIGN	\$33K	●
●	EDP AUDITOR	\$32K	●
●	PROG ANALYST COBOL/CICS	\$30K	●
●	SYS ANALYST FILE SYS	\$30K	●
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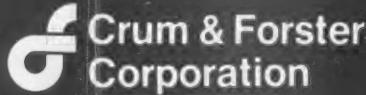
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Please send your resume in complete confidence stating salary progression and requirements to: Personnel Manager, Crum & Forster Corporation, P.O. Box 2387, Morristown, New Jersey 07960. An equal opportunity employer m/f.

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### POSITION ANNOUNCEMENT

The RAMS Cooperative, a voluntary association of Michigan intermediate school districts dedicated to the development of software for data base management systems, seeks applicants for the position of executive director.

Through the financial participation of eight intermediate school districts the RAMS Cooperative has been funded to employ programmers and systems analysts to develop programs for K-12 school district operations not currently available from private software developers. The intermediate districts then make the programs available to local school districts.

**Responsibilities:** The executive director performs administrative and planning assignments in the following areas: program specifications description applications software development personnel selection, training, assignment, and evaluation departmental and project budgeting.

**Qualifications:** Bachelor's degree preferred but not required. Candidate should have experience with data base technology and a knowledge of third generation computer systems and their application to education. Supervisory experience in systems design is also required.

**Salary:** \$35,000 minimum. Additional salary is possible based on qualifications and experience.

**Work Site:** 31201 Dorchester Madison Heights, MI 48071

**Apply to:** Mr. Robert Reeves, Director of Personnel and Facilities, Oakland Schools, 2100 Pontiac Lake Road, Pontiac, MI 48054

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## MANAGER OF SYSTEMS AND PROGRAMMING

Needed to lead a staff of 24 programmers and analysts and 3 supervisors in the development and maintenance of business applications. Strong management experience, excellent communications skills and a proven track record in application, development are required. Knowledge of OS/VS1, IMS, CICS, and COBOL is highly desirable.

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# Take your place in the sunbelt developing Data Communications, Word Processing and Microcomputer Systems at NCR/Columbia, S.C.

Opportunity is nothing new at NCR Columbia, one of the sunbelt's most attractive cities. Since our inception in 1975 we have had a continued record of growth and technical achievement for both staff and management personnel. This growth continues as we double the size of our R&D facility.

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Candidates must have practical design experience in an engineering environment and exposure to small computer operating systems. Senior candidate must have demonstrated ability to assume significant control and design responsibility over portions of a major project.

If you have the following qualifications please apply:

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- an exposure to real-time, multi-tasking, small computer operating systems
- familiarity with PASCAL and assembly languages
- at least 1-2 years industrial experience in an engineering environment
- exposure to DEC-11 series computers and operating systems (helpful but not essential)

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If you prefer, send your résumé in full confidence, or write for more information to: Aramco Services Company, Department CW0622-DR04A, 1100 Milam Building, Houston, Texas 77002.

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Badger America, Inc., is located in Kendall Square easily accessible by private and public transportation with free parking for all employees. Also available are complete medical and life insurance plans along with many other benefits.

For immediate consideration, please send resume and salary requirements to: Scott Taintor, Employment Manager, Badger America, Inc., One Broadway, Cambridge, MA 02142.

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Applicants should have solid backgrounds in payroll / personnel and financial systems, experience with report generator programs, IBM systems and COBOL programming; BA required. Salary: \$21.5 - 23K. Send resume and three letters of reference, by 7/6/81, to Charles Boland, Director of Administrative Computing Services.



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## PROGRAMMERS

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Penrose Hospitals, a 465 bed acute care dual hospital system seeking qualified programmer / systems manager with experience in the following areas: medical applications programming, data base management, systems management, understands hardware architecture and 2 years of FORTRAN programming experience on an HP-1000 computer or equivalent mini-computer system. Please send detailed resume to, or contact: David Parker, Human Resource Development, Penrose Hospital, 2215 N. Cascade Ave., Colorado Springs, CO 80907. 303-630-5236.

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Dr. Robert Caster, Director  
Computer Systems Dept., U-138  
The University of Connecticut  
Storrs, Ct. 06268  
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2 years exp. or 2 years programming. 4 yrs. High School or equivalent. Must have knowledge of COBOL. Design & implement computer systems for conversion from manual systems, as well as enhancement of existing computer systems to ensure efficient operation. \$18,824 per year to work 35 hours/5 days/week. Please send resumes to: Computer Technicians, Inc., 646 Highway 18, East Brunswick, N.J. 08816.

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**ROBERT HALF**  
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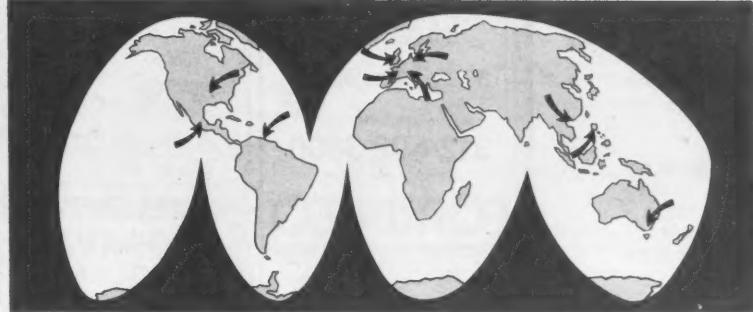
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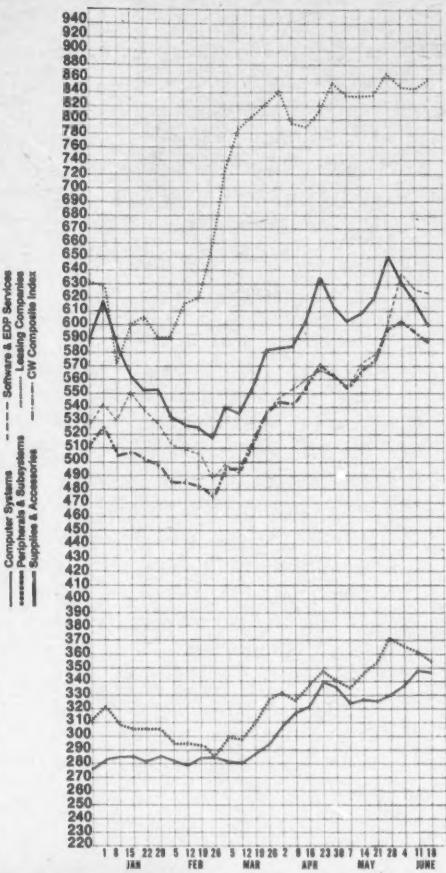
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All statistics compiled,  
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	1980-81	CLOSE	WEEK	WEEK	1980-81	CLOSE	WEEK	WEEK	1980-81	CLOSE	WEEK	WEEK
EXCH	RANGE	JUN 17	NET	PCT	(1)	1981	NET	PCT	(1)	1981	NET	PCT
<b>COMPUTER SYSTEMS</b>												
AMDahl Corp												
N	41-68	41 1/4	-	-0.8	41	41 1/4	-	-0.8	41	41 1/4	-	-0.8
N	BURGESS CORP	4-27	14 3/4	+1.4	14	14 3/4	+1.4	+1.7	14	14 3/4	+1.4	+1.7
N	COMPUTER AUTOMATION	8-27	12 1/2	+1.8	12 1/2	12 1/2	+1.8	+1.8	12 1/2	12 1/2	+1.8	+1.8
N	CONTROL DATA CORP	30-105	74 1/2	+4.0	74 1/2	74 1/2	+4.0	+4.0	74 1/2	74 1/2	+4.0	+4.0
O	CRAY RESEARCH INC	10-48	36 3/8	-1	36 3/8	36 3/8	-1	-6.0	36 3/8	36 3/8	-1	-6.0
N	DATADIRECT CORP	48-67	53 5/8	-1	53 5/8	53 5/8	-1	-1.6	53 5/8	53 5/8	-1	-1.6
N	DIGITAL EQUIPMENT	32-113	101 3/8	+1	101 3/8	101 3/8	+1	+1.0	101 3/8	101 3/8	+1	+1.0
N	ECCO INC	8-18	15 3/8	+3/4	15 3/8	15 3/8	+3/4	+1.8	15 3/8	15 3/8	+3/4	+1.8
N	ELCTRONIC ASSOC	8-27	7 3/8	-1	7 3/8	7 3/8	-1	-1.8	7 3/8	7 3/8	-1	-1.8
N	FOUR-PHASE SYSTEMS	19-48	42 1/2	+1	42 1/2	42 1/2	+1	+2.7	42 1/2	42 1/2	+1	+2.7
N	FOXBORO	31-62	62 3/8	-1	62 3/8	62 3/8	-1	-1.1	62 3/8	62 3/8	-1	-1.1
N	GENERAL AUTOMATION	7-18	13 3/8	-1	13 3/8	13 3/8	-1	-0.6	13 3/8	13 3/8	-1	-0.6
N	GRI COMPUTER CORP	1-3	1 1/4	-0.1	1 1/4	1 1/4	-0.1	-0.1	1 1/4	1 1/4	-0.1	-0.1
N	HONEYWELL	20-107	83 1/2	-3	83 1/2	83 1/2	-3	-3.8	83 1/2	83 1/2	-3	-3.8
N	HONEYWELL INC	65-115	83 1/2	-2	83 1/2	83 1/2	-2	-2.6	83 1/2	83 1/2	-2	-2.6
N	IBM	50-78	78 1/2	+1.2	78 1/2	78 1/2	+1.2	+1.2	78 1/2	78 1/2	+1.2	+1.2
N	MAGNUSON COMP SYST	20-46	31 3/8	-2	31 3/8	31 3/8	-2	-6.7	31 3/8	31 3/8	-2	-6.7
N	MANAGEMENT ASSIST	8-25	18 3/8	+1	18 3/8	18 3/8	+1	+3.0	18 3/8	18 3/8	+1	+3.0
O	MINI-COMPUTER SYST	1-8	2 3/4	-3	2 3/4	2 3/4	-3	-12.0	2 3/4	2 3/4	-3	-12.0
N	MODULAR COMPUTER SYS	9-31	13 7/8	-1	13 7/8	13 7/8	-1	-6.7	13 7/8	13 7/8	-1	-6.7
N	MOMDATA DATA SCI	10-31	23 7/8	-2	23 7/8	23 7/8	-2	-8.1	23 7/8	23 7/8	-2	-8.1
N	NCR	52-82	63 1/8	-3	63 1/8	63 1/8	-3	-0.5	63 1/8	63 1/8	-3	-0.5
N	PRIME COMPUTER INC	10-49	41 3/8	-1	41 3/8	41 3/8	-1	-4.0	41 3/8	41 3/8	-1	-4.0
N	PERIMAX CORP	10-35	36 3/8	-1	36 3/8	36 3/8	-1	-0.0	36 3/8	36 3/8	-1	-0.0
N	PEROT CORP	42-100	100 5/8	-1	100 5/8	100 5/8	-1	-1.0	100 5/8	100 5/8	-1	-1.0
N	TANDEM COMPUTERS INC	13-104	87 1/4	-2	87 1/4	87 1/4	-2	-2.4	87 1/4	87 1/4	-2	-2.4
N	TEXAS INSTRUMENTS	78-150	100 5/8	-8	100 5/8	100 5/8	-8	-8.1	100 5/8	100 5/8	-8	-8.1
N	WANG LABS.	17-80	35 3/8	-1	35 3/8	35 3/8	-1	-0.3	35 3/8	35 3/8	-1	-0.3
<b>LEASING COMPANIES</b>												
N	600TH FINANCIAL CF	13-27	25 1/4	0	25 1/4	25 1/4	0	0.0	25 1/4	25 1/4	0	0.0
N	COMDISCO INC	8-24	23 3/8	+2	23 3/8	23 3/8	+2	+10.0	23 3/8	23 3/8	+2	+10.0
A	COMMERCE GROUP CORP	1-2	1	-0.1	1	1	-0.1	-0.1	1	1	-0.1	-0.1
A	COMPUTER INSTRS CORP	1-4	5 5/8	0	5 5/8	5 5/8	0	0.0	5 5/8			

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